MECHANICAL, ELECTRICAL PLUMBING AND SPRINKLER SPECIFICATIONS

NEW YORK SOCIETY OF SECURITY ANALYSTS (NYSSA)
One World Trade Center
44th Floor
New York, NY
RDA No. 655.041.00

Owner

NEW YORK SOCIETY OF SECURITY ANALYSTS (NYSSA)
One World Trade Center
New York, NY

THE PORT AUTHORITY OF N.Y. & N.J.
ENGINEERING DEPT., QUALITY ASSURANCE DIV.
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ALTERATIONS APPLICATION
TENANT CONSTRUCTION REVIEW UNIT

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NEW YORK SOCIETY OF SECURITY ANALYSTS (NYSSA)
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GENERAL AND SUPPLEMENTARY CONDITIONS FOR MECHANICAL AND ELECTRICAL WORK

GS-1 GENERAL CONDITIONS

a. The General Conditions of the Contract, the American Institute of Architects Standard Document #A201 "General Conditions of the Contract for Construction", August 1976 edition, 14 articles, 19 pages, and the following supplementary requirements apply to all sections of this specification.

b. Where "General and Supplementary Conditions" specified in these documents modify the AIA General Conditions, they shall take precedence.

c. Where "General and Supplementary Conditions" clauses are repeated, it shall be understood as calling special attention to them or as a further qualification, and shall not be assumed as omitting any further clause of the General Conditions.

d. Maintain adequate protection of the work from damage, and protect the Owner's property and the public from injury or loss arising in connection with this work. Make good any such damage, injury, or loss, and accept exclusive liability and hold harmless the Owner and Engineer against injuries or claims therefore of all persons and any alleged damage to property in connection with the work. Erect and maintain at all times, as required by the conditions and progress of the work, all necessary safeguards for the protection of the workmen and the public.

e. Contractor adhere to all Port Authority Building Rules, Standards and Tenant Design Guidelines in effect.

GS-2 DEFINITIONS

a. The terms "Contractor", "The Contractor", or "This Contractor" refer to the Contractor awarded the work or the "Contract".

b. The term "Owner" refers to NYSSA, One World Trade Center, New York, NY.

c. "Wiring" shall be understood to mean wires or cables, with conduit, fittings, boxes, etc., installed complete.

d. "Piping" shall be understood to mean all pipes, fittings, nipples, valves, and all accessories connected thereto.

e. "As shown", "as indicated", "as specified", "as scheduled", etc., refers to information on drawings or in the specifications.

f. "Existing" refers to work, material, or equipment in existence prior to date of these specifications and contract drawings.

g. "Remove" refers to material or equipment to be removed from building.

h. "Relocate" refers to equipment to be relocated as indicated.

i. "Reused" refers to salvageable components to be utilized.

j. The words "or equal", "or approved equal", "equal to", refer to substitution of manufacturer not specified which shall receive approval of Owner or Owner's representative in writing.

k. "Provide" shall mean "furnish and install" or "furnish labor and material required for installation of".

l. "Directed" shall mean as directed by Owner or Owner's representatives.

m. "Concealed", where used in connection with insulation and painting of piping, conduit, ducts, and accessories, shall mean that they are hidden from sight as in trenches, chases, furred spaces, pipe shafts, or hung ceilings; also where they are not hidden from sight in partly excavated or crawl spaces.

n. "Exposed", where used in connection with insulation and painting of piping, conduit, ducts, and accessories, shall mean that they are not concealed as defined above.

GS-3 INDEMNITY

a. Provision must be made to insure the "Hold Harmless Agreement" which reads as follows:

1) "The Contractor hereby agrees to indemnify and save harmless the Owner, Building Management, and Engineers from and against all liability claims and demands on account of injury to persons including death resulting therefrom and damage to property arising out of the performance of these contract documents by the Contractors's property. The Contractor shall, at his or its own expense, defend any and all actions at law brought against the Owner, and the same Owner's representative above and shall pay all attorney's fees and all expenses, and promptly discharge any judgments arising therefrom. These conditions shall also apply to any subcontracted operations."

2) The Contractor shall secure and protect the Work and shall bear and be liable for, and shall repair and replace all loss and damage of any kind which may happen to the Work at any time prior to the final completion and acceptance thereof from any cause whatsoever, and the Construction Manager, Owner and Engineer will not, in any manner, be answerable or responsible for any loss or damage that shall happen to the Work or any part therof, nor for any materials, equipment, tools, plant, facilities or other things that may be employed therein or placed upon the premises by the Contractor, the latter being solely responsible therefore until the Work has been fully accepted by the Owner.

3) Contractor hereby agrees, to the extent permitted by law, to assume the entire responsibility and liability for and defense of and to pay and indemnify the Owner, any lender providing construction or permanent financing for the Project, Construction Manager and the Engineer (collectively the "Indemnities") against any loss, expense or liability and will hold each of them harmless from any pay any loss, damage, cost or expense (including without limitation, judgements, attorney's fees, court costs and the cost of appellate proceedings), which the Indemnities (collectively or individually) incur because of injury to or death of any person or on account of damage to property, including loss of use thereof, or any other claim arising out of, in connection with or as a consequence of the performance of the Work, and/or any act or omission of the Contractor or any of its subcontractor, officers, directors, employees, agents or anyone directly or indirectly employed by Contractor or anyone whose acts Contractor may be liable as it relates to the scope of this Contract. However, nothing herein contained shall require the Contractor to provide indemnification against the proportion of any liability for claims which are proven to have arisen from the negligence of the party asked to be defended, indemnified or held harmless. Contractor will purchase and maintain such insurances as will protect it from any costs and expenses relating to the foregoing, including, without limitation, contractual Coverage covering the foregoing indemnity, and shall provide Construction Manager and Owner with certificates evidencing same in the form annexed hereto.

GS-4 INSURANCE TO BE PROVIDED BY CONTRACTOR

a. The Contractor shall, through agents and in amounts and by companies to be approved by the Owner, obtain, maintain in force during the period covered by the Contract and pay for such insurance as required herein. If the Contractor shall

fail to deliver certificates for its insurance or the insurance of its subcontractors to the Owner within forty-eight (48) hours after demand, and in any event, prior to commencement of the Work on the Project, the Construction Manager or Owner may obtain such insurance for the Contractor and pay premiums thereon, and the Contractor shall repay the Construction Manager or Owner, on demand, any sum or sums paid therefore, together with interest thereon, or the Construction Manager or Owner, may deduct such sum or sums, together with interest therein, from any money due or to become due to the Contractor under this Contract. As provided below, every policy of insurance required hereunder shall name the Indemnities as additional insureds and shall provide for giving the Owner and Construction Manager and the other Indemnities if so requested in writing thirty (30) days' prior written notice of the cancellation thereof.

b. Any policy of insurance covering the Contractor's own tools, plant and facilities against loss by physical damage shall include an endorsement providing that the Underwriters waive their rights of subrogation against the Owner and the Construction Manager.

c. The Contractor shall not commence work under this Contract until it has obtained all of the insurance referred to herein and Contractor and/or subcontractor shall be required to maintain the following insurance in amounts not less than those specified below:

1) Worker's Compensation in accordance with the laws of the State with Jurisdiction.

2) Employer's Liability insurance in an amount not less than $100,000.00.

3) Comprehensive General Liability/Umbrella Liability for:

a) Bodily Injury Liability Insurance

b) Property Damage Liability

with limits of $1,000,000/$5,000,000 combined single limit each occurrence, including, but not limited to, Comprehensive Form Premises - Operations, Explosion and Collapse Hazard, Products/ Completed Operations Hazard (2 years extension beyond completion of Project), Contractual Coverage, (including coverage for the Indemnity Clauses provided under this Contract) Broad Form Property Damage, Independent Contractors, Personal Injury (employees exclusion deleted) and 'X', 'C' and 'U' exclusions deleted.

c) Comprehensive Automobile Liability

Comprehensive, Owned, Hired, Non-Owned with limits $500,000 combined single limit each occurrence.

d) Contractor shall verify that these requirements are acceptable to the Owner. If not, they shall obtain insurance coverages in accordance with their requirements.

d. The above insurance shall, without liability on the part of the Owner and/or Construction Manager shall without liability on the part of the Owner and/or Construction Manager for premiums thereof, include the following:

1) Endorsement as Additional Insureds of:

a) Owner, Lender, Engineer and Construction Manager and their partners, directors, officers, employees, agents, and representatives; and

b) all other indemnities named in the Contract.

2) Thirty (30) Day Prior Notice of Cancellation to each name insured; and

3) Waiver of Subrogation.

e. The above policies shall be endorsed to contain the following wording verbatim:

1) "Owner and Construction Manager are interested in the maintenance of this insurance and it is agreed that this insurance will not be cancelled, materially changed or not renewed without at least a thirty (30) day advance written notice to Owner and Construction Manager and the other additional insureds of so requested in writing.

"Contractor hereby agrees, to the extent permitted by law, to assume the entire responsibility and liability for and defense of and to pay and indemnify the Owner, any lender providing construction or permanent financing for the Project, Construction Manager and the Engineer (collectively the "Indemnities") against any loss, expense or liability and will hold each of them harmless from any pay any loss, damage, cost of expense (including without limitation, judgements, attorney's fees, court costs and the cost of appellate proceedings), which the Indemnities (collectively or individually) incur because of injury to or death of any person or on account of damage to property, including loss of use thereof, or any other claim arising out of, in connection with our as a consequence

of the performance of the Work, and/or any act or omission of the Contractor or any of its subcontractors, officers, directors, employees, agents or anyone directly or indirectly employed by Contractor or anyone for whose acts Contractor may be liable as it relates to the scope of this Contract. However, nothing herein contained shall require the Contractor to provide indemnification against the proportion of any liability for claims which are proven to have arisen from the negligence of the party asked to be defended, indemnified or held harmless. Contractor will purchase and maintain such insurance as will protect it from any costs and expenses relating to the foregoing, including, without limitation, contractual coverage covering the foregoing indemnity, and shall provide Construction Manager and Owner with certificates evidencing same."

"Coverage includes as Additional Insureds Owner, any lender providing permanent or construction financing for the Project, Engineer and Construction Manager and their partners, directors, officers, employees, agents and representatives; and 2) all other Indemnities named in the Contract as respects worked performed by or for the Named Insured in connection with 'the Project'."

"The Insurance Companies waive their rights of subrogation against the Additional Insureds which may arise by reason of payment under the Comprehensive General Liability and Umbrella Liability policies in connection with 'the project'."

f. Contractor will be required to purchase and maintain such insurance as will protect it for the contractual indemnity of this project.

g. Upon request of the Owner or Construction Manager, the Contractor shall add additional insureds at no expense to the Owner or Construction Manager.

GS-5 SUBCONTRACTS

a. Should the Contractor engage a subcontractor, the same conditions applicable to the Contractor under this Contract shall apply to each subcontractor, including, but in no way limited to, this Indemnity.

GS-6 CANCELLATION, ETC.

a. The Owner and Construction Manager are interested in the maintenance of this insurance and it is agreed that this insurance will not be cancelled, materially changed or not renewed without at least thirty (30) day advance written notice to Owner and the other additional insureds if so requested in writing.

GS-7 SHUTDOWNS

a. When installation of a part of any system (plumbing, heating, air conditioning, electrical or otherwise) requires a shutdown of any operating system, connect the partial system only after notification to and with approval of the Owner. Coordinate activities closely with those of Subcontractor's so the operation is restricted to as short an interval as possible and "out of service" time of these facilities is kept to a minimum. Any shutdown of the electrical system will be done out of hours as approved by Owner.

b. It is imperative that existing systems be maintained in continuous operation during the course of construction; if shutdowns are required to permit the disconnections and removal or reconnection of existing work, or final connection to be made to an existing system, they shall occur only during off-hours and only after power permission has been obtained from Building Management.

c. The Building Management requires not less than seven days notice for shutdown of any building system.

d. Where work during any shutdown period involves the draining and refilling of any water, chilled water, or any other piping system such draining and refilling shall be done by the Contractor. All fluids used for refilling should be of the same type and quality as those derived from the system.

GS-8 CUTTING, ALTERING AND PATCHING

a. The Contractor shall do all cutting, altering and rough patching as required for the installation of the work of all trades employed under this contract, including the restoring of existing work cut for or damaged by installation of new work, and where present work is removed. All materials and workmanship required in connection with cutting, altering and patching shall match the existing work in every respect.

b. All holes and openings occurring in the existing floors after equipment, partitions, floors, steel work, conduits and pipes are removed or installed shall be closed up with materials similar to the adjacent work.

c. The size and location of items requiring an opening, chase or other provisions to receive it shall be given to the Construction Manager by the trade requiring same in ample time to avoid undue cutting of any new work to be installed. This provision shall not relieve the Contractor from keeping informed as to the required opening, chases, etc., nor from responsibility for the correctness thereof, nor for cutting and repairing after the new work is in place.

d. The Contractor shall include all cutting, repairing and patching in connection with his work that may be required to make the several parts come together properly and fit it to receive or be received by the work of other trades, as shown on the drawings and/or specified, or reasonably implied by the drawings and specifications.

e. All repairing, patching, piecing-out, filling-in, restoring and refinishing shall be neatly done by mechanics skilled in their trade to leave same in condition satisfactory to the Engineer.

f. Materials and their methods of application for patching shall comply with applicable requirements of the specifications.

g. Cutting, repairing and patching shall include all items shown on the drawings, specified in the specifications or required by the installation of new work or the removal of existing work.

h. The Contractor shall protect and be responsible for the existing building, facilities and improvements. Any disturbance or damage to the work, the existing building, and improvements, or any impairments of facilities resulting from the construction operations, shall be promptly rectified, with the disturbed, damaged, or impaired partitions restored, repaired or replaced at no extra cost.

i. All alterations which are not indicated on the drawings not specified herein but necessary to make good existing work disturbed by reason of the work shall be restored to a condition satisfactory to the Engineer.

GS-9 DEMOLITION WORK

a. The Contractor shall perform all of the demolition work specified in the contract documents, and shall remove from the site all resultant debris and materials which are not to be reused.

b. None of the materials and fixtures removed from the work, except as otherwise shown or specified, shall be used in the new work.

c. Existing equipment and materials to be reused described by the term "reset" or "relocate" in the specifications or on drawings, shall be disconnected, removed, stored, repaired, altered as necessary, cleaned thoroughly, and if of wood or ferrous metal, surfaces inaccessible after installation primed in same manner as for new work.

d. A walk-through of the premises will be schedule with the Construction Manager during the bid period to visually observe the extent of the demolition work associated with each trade. Each trade shall be fully responsible for all necessary demolition and removals associated with his work.

e. The Contractor shall be held responsible for the condition of all materials and fixtures which are to be reused. Care must be exercised in their removal so that no damage occurs. Should the materials or fixtures be damaged by the Contractor, he shall be responsible to repair to the satisfaction of the Owner or replace in kind.

GS-10 SAFETY OF PERSONS AND PROPERTY

a. Carefully plan the work and see to it that it is executed in an organized orderly and safe manner. Danger and warning signs shall be prominently displayed, and exercise every precaution to offer the fullest protection to pedestrian traffic in and around the premises, building tenants and their guests, Owner's managment and maintenance personnel, and Owner's representatives.

b. Pay particular attention to fire safety precautions during construction, particularly where welding is required. Storage of flammable and combustible material shall be as directed by the Owner.

c. Contractor shall conform to construction and building fire regulations as directed by Building Management. In addition to regulations and practices as required by local governing authorities. All requirements of these representatives shall be adhered to at no additional cost to the Owner and the contract.

GS-11 LAWS, RULES, PERMITS, FEES & REFERENCES

a. All work and materials shall be in full accordance with the latest rules and regulations of all Municipal Codes and State Laws or regulations. Nothing in these plans or specifications is to be construed to permit work not conforming to these Codes. In cases where Code requirements differ, the more stringent Code shall take preference.

b. Pay any royalties or fees required in connection with the use of any patented devices or systems, and save Owner harmless from any claims or lawsuits arising from such use.

c. Give all notices, obtain all required permits, perform all tests, and pay for all Local, State and Federal taxes, fees, royalties and other costs. File all necessary plans and obtain all approvals of all Municipal and State authorities having lawful jurisdiction. Secure and pay any necessary approvals, permits, inspections, etc., and deliver the

official records of the granting permits to the Owner. This shall be done without additional cost to the Owner.

d. Federal Safety and Health Regulations: This Contractor must observe and abide by all requirements of Federal Safety and Health Regulations as established by Congress and known as the "Occupational Safety and Health Act of 1970".

GS-12 COORDINATION

a. Due to the type of installation, a fixed sequence of operations is required to properly install the complete system. Closely schedule the work in accordance with the requirements as directed by the Construction Manager so that work will be installed with minimal disruption to the building occupants and operation procedures.

b. Carefully check space requirements with existing conditions, the Owner's representative and all affected Contractors to insure that chillers, pumps, equipment, ductwork, pipes, conduit, etc. can be delivered to the site, properly stored and installed.

c. Coordinate the work of the section with existing conditions and the work of other sections. The Contractor shall thoroughly acquaint himself with the work involved, and shall verify at the building all measurements necessary for the proper installation of the work, obtaining the same when necessary from the other Contractors and sections. Contractor shall also be prepared to promptly furnish to other Contractors any information relating to the work of this section necessary for the proper installation of other contracts and shall cooperate to secure the best progress of, and harmony between, the work of the different contracts and sections in the interests of the installation as a whole. Confer with other Contractors and Engineer for adjacent work to this section and arrange to have visible portions of work fit and harmonize in a manner satisfactory to the Owner's representative.

d. Examine all existing work or work previously executed by other Contractors which may be associated with the new work of this Contract and report any installation conflicts affecting installation of the new work to the Engineer. Commencement of work will be construed as complete acceptance of the installation conditions.

e. Check the construction drawings, shop drawings and equipment details of other contracts, trades and sections, noting all interferences, and immediately call to the attention of the

Engineer who will make the proper disposition of same. Work shall be scheduled so as not to interfere with the work of other sections.

f. Wherever work under the contract requires information, material, equipment, etc. to be given to or received from other sections, these items shall be transmitted or requested expeditiously to maintain installation schedules and avoid delays in work of the other sections.

g. Perform the work at such time and in such manner as to minimize interference with building's normal operation. Notify Owner's representatives in advance each time a service outage or interruption will be required for the performance of some phase of the work. Schedule such service outage or interruption only after having received approval of date, hour, and time interval required thereof. Schedule or work as directed shall be followed as closely as possible.

GS-13 INTENT AND INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

a. The specifications are accompanied by drawings indicating the general location of equipment and connections thereto. Unless specifically dimensioned, locations of equipment and routings are approximate. Scales on drawings are indicated for bidding purposes only. Drawings shall not be scaled for construction and manufacturing details.

b. Certain systems are diagrammatic and give the general arrangement only. No added compensation will be permitted for variations due to field conditions. Exact locations and arrangements shall be determined in the field on the basis of details indicated on approved shop drawings, and supplementary information issued by the Engineer, and shall provide for operating efficiency, neatness of appearance, and ease of maintenance.

c. In all cases where a device, apparatus, or part of equipment is referred to in the singular number, it is intended that such reference shall apply to as many such times as show or required to complete the work.

d. The work throughout shall be executed in the best and most thorough manner, under the direction of, and to the satisfaction of, the Owner and Construction Manager, who will jointly interpret the meaning of the drawings and specifications, and shall have the power to reject any work and materials which, in their judgment, are not in full accordance therewith.

e. It is specifically intended, and must be agreed to by the Contractor submitting a bid under this specification that anything (whether material or labor) which is usually

furnished as part of such equipment as is hereinafter called for (and which is necessary for its proper completion and operation) shall be furnished as a part of this contract without additional cost, whether or not shown in detail on the drawings or described in detail in the specifications.

f. Where disagreements occur between the drawings and the specifications, or within either document itself, the item or arrangement of better quality, greater quantity or higher cost shall be included in the contract.

g. Particular care should be taken so as not to affect in any way the basic design of any system. Changes in arrangements and/or sizes of piping, ductwork, conduit, panels, equipment, etc. shall not be effected without the prior written approval of the Engineer. Except for such changes as may be specifically approved by the Engineer or in accordance with approved alternates or options, all work must be in full accordance with the intent of the plans and specifications, complete in every way and ready for satisfactory and efficient operation when delivered to the Owner.

h. The drawings and specifications of other sections or contracts shall be checked for thorough coordination with work to be performed under this contract.

GS-14 EXECUTION OF WORK

a. Guarantee that the materials and workmanship supplied under the section and contract will be of the best grade, that the installation will be erected in a practical and first-class manner, that it will be complete in operation, nothing being omitted in the way of labor and materials required to make it so, although not specifically shown or mentioned herein and that it will be delivered in well-working order, complete and perfect in every respect with guaranteed service and performance.

b. Execute the work as fast as reasonably possible. At all times, keep a competent foreman in charge of the work, and facilitate the inspection of the work by the Owner and Construction Manager.

c. Be responsible for the work until its completion and final acceptance and replace any of the same which may be damaged, lost or stolen, without additional cost to the Owner.

d. Contractor shall arrange for shop drawing production as prepared by piping engineers and sheet metal draftsman, and sketches to be performed in building premises when requested by Engineer.

GS-15 EXAMINATION OF SITE

a. Visit the building and specifically all areas designated for the installation, and become familiar with existing conditions; examine all drawings relating to the work, and become fully informed as to the extent and character of the work required. Determine any conditions which affect the work. Make a thorough site investigation before submitting bids. No allowances will be made for failure to avail of such information.

b. Take all necessary field measurements of existing conditions as required for fabrication and installation for work of this contract and assume complete responsibility of accuracy of such measurements.

c. Although the location of equipment be shown on the drawings in a certain place, the construction of the building may disclose the fact that the location for this work does not make its position easily and quickly accessible. In such cases, call attention to this fact to the Engineer well in advance of installing work for direction.

d. Investigate spaces, doors, and passages into and through which equipment must be moved and made arrangements for installing large pieces of equipment. Equipment shall be in section of sizes suitable for moving through restricted spaces and openings.

GS-16 STORAGE OF CONTRACTORS MATERIALS

a. Space within the building will be designated by the Owner for storage of tools, materials, equipment, etc. Provide any additional protection required, and assume all responsibility for damage of materials. Materials shall be received at the building in locations as approved by the Owner.

GS-17 USE OF BUILDING ELEVATORS

a. Usage of service elevators will be permitted as directed by the Owner for movement of materials and equipment to the designated installation areas. Use of these elevators shall be coordinated with the Owner prior to site delivery.

b. Passenger elevators will not be used without expressed direction of Owner well in advance to permit building arrangements if such work is to be authorized under normal circumstances.

GS-18 APPROVED EQUIPMENT AND MATERIALS

a. Most items of mechanical and electrical equipment and material are noted on the drawings or in the specifications

with a manufacturer's name and catalog number. This designation is used to set the standard for construction, performance, operation and appearance. Products of other manufacturers will be considered and ruled upon by the Engineer. The submission of a substitution implies that the item has all necessary Underwriters' Laboratories, Board of Standards and Appeals, New York City MEA, National Electrical Code, New York City Electrical Code and New York city Electrical Advisory Board, etc. approvals. Should the item be found not to have such approval, it shall be replaced by the Contractor at no additional cost to the Owner.

b. Furnish information as required to demonstrate that the article, material, apparatus, product or process to be used is adequately comparable to that specified in quality, finish, design, efficiency, durability and general appearance, and has been elsewhere demonstrated to be serviceable for the purposes for which it is intended. If tests or demonstrations are required by the Owner's representatives, the cost of such tests or demonstrations shall be borne by the Contractor.

c. Contractor shall set forth the reasons to make the substitution and further state what difference, if any, will be made in the contract price fur such substitution, should it be acceptable.

GS-19 EQUIPMENT AND SYSTEMS DEVIATIONS

a. The dimensions and ratings of equipment herein specified or indicated on the drawings are intended to establish the outlines and characteristics of equipment furnished by the particular manufacturer or manufacturers specified.

b. Where approved deviations require any redesign of the structure, partitions, foundations, piping, wiring, ductwork, etc., or redesign of any other part of the mechanical, electrical, or architectural layout, all such redesign and all new drawings and detailing required therefore shall be at Contrac- tor's expense for the services which must be performed by the Owner's representatives at no cost to the Owner.

c. Where approved deviation requires a different quantity and arrangement of piping, wiring, ductwork, conduit, equipment, etc. from that specified or indicated on the drawings, furnish and install any such additional items required by the system, at no additional cost to the Owner.

GS-20 DRAWINGS AND INFORMATION REQUIRED

a. Prepare and submit detailed shop drawings for all of the ductwork, piping work, or other distribution services

described herein, or which require close coordination with other work of this section and/or the work of other sections and existing conditions. In case of question, the Engineers will be the final word as to the requirement for shop drawings for specific areas of work.

b. Sheet metal shop drawings shall be at a minimum of 3/8" = 1'-0" scale. These shop drawings shall be used as the coordination drawings for all trades, especially for the sprinkler work, piping installation and major conduit runs.

c. The work described in any shop drawing submission shall be carefully checked by this Contractor for all clearances (including those required for maintenance and servicing), field conditions, maintenance of architectural conditions and proper coordination with all Contractors on the job. Each submitted shop drawing shall include a certification that all related conditions on the job have been checked and that no conflict exists. No shop drawing submission shall be without such certification.

d. Submit to Engineer the electric wiring diagrams, automatic control diagrams and sequence of operation. The wiring diagrams must be complete and coordinated with the equipment actually installed.

e. All drawings, etc. shall be submitted sufficiently in advance of field requirements to allow ample time for checking and no claim for extension of the project schedule will be granted by reason of failure in this respect. All submittals shall be complete and shall contain all required and detailed information.

f. Submit manufacturer's data, catalog numbers, or shop drawings for equipment, materials, system components, etc., giving full information as to dimensions and adequacy of such items to meet and verify the requirements of the drawings and specifications.

g. If the submittals differ from the requirements of the construction documents, make specific mention of such difference in the letter of transmittal, with a request for substitution, together with reasons for same in order that, if acceptable, suitable action may be taken for proper adjustment. Otherwise, the Contractor will not be relieved of the responsibility for executing the work in accordance with the construction documents, eventhough conformance item not indicated in Contractor's submittal.

h. The processing of any submitted data or shop drawings for material, equipment, apparatus, devices, arrangements and/or layout, shall not relieve the Contractor from the responsibility of furnishing same of proper dimensions and weight, capacities, sizes, quantity, quality and

installation details to efficiently perform the requirements and intent of the contract. Such processing shall not relieve the Contractor from responsibility for errors of any sort on the submitted data or shop drawings.

i. Submit to the Engineer one (1) sepia and five (5) prints of each drawing, including fabrication, erection, layout and setting drawings, and such other drawings as required under the various sections of the specifications until final approval is obtained. Submit five (5) copies of manufacturers' descriptive data for materials, equipment and fixtures, including catalog sheets showing dimensions, performance characteristics and capacities; wiring diagrams and controls; schedules; and other pertinent information as specified and required. Transmit final approved shop drawings to other Contractors affected by the work.

j. Make every effort to furnish all equipment of any equipment type (such as fans, motors, motor controls, pumps, valves, etc.) from one manufacturer.

GS-21 AS-BUILT DRAWINGS

a. Upon completion of installation, at Contractor's own expense, furnish two complete sets of as-built drawings. These drawings shall be submitted to the Owner for approval. After approval, they shall become the property of the Owner. Final payment will be withheld until receipt of the approved as-built drawings. As-built drawings constitute approved Contractor's shop drawings and manufacturer's equipment submittals.

GS-22 REMOVAL OF EXISTING EQUIPMENT

a. Make an accurate take-off all existing equipment, ductwork, piping, conduit, panelboards, wiring devices, and other accessories being removed during demolition and include the cost for disconnecting and removal of said equipment, etc. into the Base Bid. Removals shall be as specified and/or as indicated on the drawings. In certain cases, equipment or materials designated for removal shall remain the property of the Owner and shall be turned over at locations in the building as directed by the Owner.

b. A walk-through of the premises will be held during the bid period with the Construction Manager to indicate the extent of the removals (see "Demolition Work in these specifications).

GS-23 NAMEPLATES, CHARTS AND TAGS

a. Furnish and install laminated Bakelite, Lamicoid, or similar approved nameplates, screwed onto or close by every manual valve, automatic valve, pilot light, remote pushbutton,

panel mounted switches, temperature and pressure gauges, etc. Also provide a nameplate for each control panel and other equipment enclosures. Dymo labels will not be accepted.

b. Nameplates shall not be less than 2-1/2" x 3/4" x 1/8" thick, white, 1/4", upper case, cored letters on black background, with beveled edges. Nameplates shall clearly identify each item of equipment such as name and number of the equipment shown on the contract drawings, or as approved by the Owner.

c. Finished coverplates for pushbutton, switches, indicating light or special outlets shall have the inscription engraved in contrasting 3/16" black letters.

d. Furnish and install on each valve a numbered 1" brass tag, secured to handwheel with metal chain link. Use square tags for plumbing work and round tags for heating and air conditioning work.

e. Furnish and install in Mechanical Equipment Room, where directed, a glass covered, valve chart listing each new valve in the room by system, function and number. This chart shall include all valves in the room furnished under this contract.

f. All charts shall be submitted in draft form for approval prior to final issue.

g. Stencil function and service on each new time of equipment in equipment rooms in 5" high black lettering on light background.

h. Pipe labels indicating service and direction of flow shall be applied at approximately 20 feet intervals and near equipment and major branch connections.

GS-24 TEMPORARY LIGHTING AND POWER FOR INSTALLATION

a. Temporary lighting and power shall be provided under the Electrical section of these specifications by the Electrical Contractor.

b. Usage of permanent wiring systems and equipment for Contractors' temporary light and power requirements is permitted provided the size of the loads applied meets the requirements of New York City Code, and methods of use are approved by Owner.

c. Under the Electrical section, maintain temporary lighting and power system in good working conditions, including the relocation and reinstallation when required to avoid interference with the progress of the work. Install

temporary light and power in each room constructed to provide working illumination until permanent lighting is installed and energized.

d. Owner will pay costs of electric energy consumed.

e. Temporary power and light shall provide facility for general lighting and portable hand tools and for welding machines.

f. All work in connection with temporary wiring shall be removed at the completion of work as required or as directed by the Owner under the Electrical section of the Specifications.

g. The temporary light and power circuit connections to the existing distribution system shall be organized in accordance with the main building service shutdowns (see attachment in the end or this section).

GS-25 ERRORS AND OMISSIONS

a. In order to discover and resolve and conflicts or lack of definition which might create construction problems, bidder verifies that:

1. "We have examined the drawings and specifications for work included. Except for the items described in the attached list, we have discovered no errors, omissions, impractical details, violation of laws, ordinances, rules and regulations of authorities having jurisdiction, or conflicts which would require deviations from the drawings and specifications." (List items for which clarification is necessary in attachment to Bid Quotation Form).

GS-26 GUARANTEE

a. All work performed under these construction documents shall be guaranteed by each Contractor against faulty and improper material and workmanship for a period of one (1) year from the date of final acceptance and/or beneficial use, whichever occurs first, by the Owner, except that where guarantees or warranties for longer terms are provided by manufacturers, such longer terms shall apply. At no additional cost to the Owner, promptly correct any deficiencies which occur during the guarantee period, all to the satisfaction of the Owner. Provide similar guarantees from subcontractors, manufacturers and suppliers.

b. Be responsible for all leaks in all new piping for a period of one (1) year from the date of completion of work under this contract. Repair at no expense to the Owner, all such leaks which occur after completion of this contract upon 24 hours' notice thereof by the Owner. Leaks which occur prior

to the completion of this contract shall be repaired at once. Be responsible for any damage caused by such leaks and the repair thereof and reimburse the Owner for all such expenses incurred thereby.

c. All refrigeration compressors shall have a factory guarantee including parts and labor for five years total.

d. The final acceptance will be made after the Contractor has adjusted his equipment, balanced the various systems, demonstrated that it fulfills the equipment of the Drawings and Specifications, and has furnished all the required Certificates of Inspection and approvals.

GS-27 INSTRUCTION MANUAL

a. Submit to the Owner 3 copies of bound instruction manuals containing the following materials for all HVAC, Electrical and Plumbing systems:

1. Manufacturer's mechanical and electrical equipment parts list of all components of the systems listed on the equipment schedules, control diagrams and wiring diagrams of controllers. List shall give System No., Unit No., Manufacturer's Model No., and Manufacturer's Drawing No.

2. Step by step operating instructions for each system including preparation for starting, summer operation, winter operation, shutdown and draining.

3. Maintenance instructions for each type of equipment.

4. Possible breakdowns and repairs for each type of equipment.

5. List of nearest local suppliers for all equipment.

6. Manufacturer's literature describing each piece of equipment listed on the equipment schedules, control diagrams and wiring diagrams of controllers and a copy of the Air Balance Report.

7. As-installed control diagrams by the control manufacturer.

8. Description of sequence of operation by the control manufacturer.

9. Complete "as-installed" color coded wiring diagrams of all systems and all electrical motor controller connections and interlock connections of all other mechanical equipment.

10. Chart of the tag numbers, location and function of each valve.

11. Single line diagrams and riser diagrams as applicable.

GS-28 PERFORMANCE TESTS

a. Upon completion of the installation, test and balance all equipment and systems under field operating conditions to demonstrate its compliance with specification requirements.

b. Should any part of the system fail to meet the contract requirements, adjust, repair or replace all defective or inoperative parts and again conduct the complete performance tests.

c. Submit test reports to the Owner.

GS-29 ELECTRICAL EQUIPMENT AND CONTROLS

a. Supply electric motors, starters, and controls for all electrically operated and motor driven equipment furnished or supplied under respective specifications.

b. All electrical motor starters and unmounted motors shall be installed under Electrical specifications.

c. All electrical motors installed under respective specifications shall be wired up complete under Electrical specifications.

d. All electrical automatic controls furnished or supplied under respective specifications, whether or not specifically mentioned or shown on drawings, shall be wired up complete under the respective section of the work.

e. All separate disconnect switches and transfer switches on line side or motor starter shall be furnished under Electrical specifications.

GS-30 REMOVALS AND RELOCATIONS

a. All components or abandoned systems and abandoned portions of system are to be removed, and unless specifically noted to be relocated and reused, are to become the Contractor's property and removed from the premises.

b. Where portions of systems noted for removal remain in use, permanently seal the point of disconnection so as not to interfere with system operation.

c. Where interferences between existing system components and new work require relocation of the existing components to clear that interference, they may be reused, except where

specifically noted to the contrary, providing that their condition is noted by the Owner's representative and they are approved by him as equivalent to new.

d. Where existing system components are required to be replaced, all new components shall be provided.

e. System components include all accessories, cables, controls, conduits, hangers, bases and supports and outlets.

f. Include in the bid the cost for the removal and/or relocation of all obstructions.

GS-31 TIME AND MANNER

a. As time is of the essence of this contract, furnish labor and materials in sufficient quantities and in ample time, do all expediting and scheduling of work required and so manage the operation that work will be completed within time stated in contract, plus any extensions thereof approved by Owner in writing. Should the work not be completed on or before the contract date, Owner reserves the right to direct the Contractor to leave the job during installation of Owner's equipment and to return and complete his work thereafter without any increase in cost to Owner.

b. Before undertaking the work, submit an outline and graphic schedule of proposed procedures for approval in order that Owner may plan for and accommodate necessary arrangements to permit work to be done. Progress schedule shall indicate anticipated times when work on each trade is expected to be started and completed. At least once a week, during construction period, schedule shall be revised and resubmitted to show dates when work of each trade actually was begun and completed and any extensions to original schedule approved by Engineer. It shall be submitted by means of a reproducible as specified for shop drawings.

c. Exercise care at all times to maintain cleanliness in operations, avoid fire and accident hazards and remove inflammable debris promptly. Keep premises clean of construction dirt, dust and debris and maintain conditions acceptable to Owner at all times.

d. It shall be the specific responsibility of the Contractor to advise his Subcontractors what responsibility each has in scheduling and performing his work to conform to established progress schedule and contract completion date. Subcontractors must be particularly advised, preferably in the terms of agreements entered into by and between them and Contractor, as to time when operation of condenser water system and other apparatus will be required and when all

testing of mechanical equipment shall be done so as to have been completed in advance of final inspection to be held on or about contract completion date, and it shall be the further obligation of Contractor to see that the several Subcontractors cooperate fully with one another to that end.

NEW YORK SOCIETY OF SECURITY ANALYSTS (NYSSA)
One World Trade Center
44th Floor
New York, NY
RDA No. 655.041.00

HEATING, VENTILATING AND AIR CONDITIONING SPECIFICATIONS

HV-1 GENERAL

a. All work in this section is subject to General and Supplementary Conditions of these Specifications.

HV-2 SCOPE

a. Include all labor, materials and equipment required for the furnishing, installing, and testing, complete and ready for operation in a manner satisfactory to the Building and Owner, all herein specified, including in general, the following:

1. Condenser water cooled air conditioning units
2. Insulation (Thermal and Acoustical)
3. Vibration Isolation
4. Thermostats
5. Ductwork
6. Exhaust fan
7. Piping
8. Air outlets
9. Air Balancing
10. Automatic Controls
11. Controlled Inspection and Equipment Use Permits

HV-3 CONDENSER WATER COOLED AIR CONDITIONING UNIT: AC-1, 2, 3 AND 4

a. General: Provide ceiling mounted condenser water unit in accordance with the Contract Documents and to include:

1. All self-contained factory wired controls.

2. Complete assembly including motors, cooling coil, supply fan, filters, all necessary accessories and controls, transformer, interconnecting refrigerant piping, valves and wire assembled within a finished cabinet. Unit arranged to discharge and return air horizontally as shown.

3. Contractor responsible if cutdown frame is required to facilitate the unit re-assembly in proper location. Contractor responsible for labor and materials to rig, disassemble and re-assemble the units. Coordinate with unit manufacturer as required.

b. Standards and Codes

1. Except as modified by governing codes and by Contract Documents, comply with the applicable provisions and recommendations of AMCA, ASHRAE and UL.

c. Submittals

1. Shop drawings indicating size, type, location, details and installation requirements. Confirm AMCA certified ratings and UL listing.

2. Product Data: Manufacturer's printed data, catalog cuts, test data, manufacturer's recommendations.

d. Acceptable Manufacturers

1. Air Technology Systems (A.T.S.)

e. Air Conditioning Unit (refer to air conditioning unit schedule, Drawing M-44-2):

1. Cooling Coil: Copper tube, aluminum fins, stainless steel drain pan; coil fitted with manual air vents. Coil shall be factory pressure tested and ARI rated.

2. Fan: Dynamically and statically balanced to minimize vibration and shall operate in the Class I range. Motor(s) shall be with internal overload protection.

3. Filters: Throw-away, arranged to filter all air handled by unit. Woven glass fiber 1" deep, slide out throw-away type. All filters rated UL Standard 900, Class 1.

4. Cabinet: Corrosion protected with removable panels for access to all equipment and provision for return air. Insulate interior of cabinet with 1/2" rigid fiber glass insulation. All piping and electrical connections shall be through the side of the unit. Access panels shall be mounted to provide service access to all components.

5. Compressor: Internally spring isolated, sealed full hermetic with internal thermal overload protection..

6. Standard Components to Include:

a) High/low refrigerant pressure switches.

b) Low temperature cutouts.

7. Optional Accessories to Include:

a) Non-locking disconnect switch, NEMA type in conformance with National Electric Code Standards.

b) Duct mounted smoke detector. Smoke detector shall shut-down unit upon sensing a smoke condition and sound an alarm at the building fire command station.

c) Spring vibration isolation.

d) AC control panel with Honeywell (Chronotherm III) electronic programmable thermostat with time clock and humidistat.

e) Hot gas reheat

f) Humidification

g) Water overflow alarm package

h) Sound attenuation package

i) Auxiliary drip pan with water sensor

j) 415 PSIG working pressure

HV-4 PIPING

a. General: Provide piping work in accordance with the Contract Documents.

b. Except as modified by local governing codes and the Contract Documents, comply with the applicable provisions and recommendations of ANSI, ASTM, ASME and AWS.

c. Copper Piping: Braized (condenser water piping) or soldered (condensate drain piping) joints with 95-5 tin/antimony solder of sufficient stress capability to sustain system working pressures and pipe expansion stresses.

d. Pipe Materials:

Service	Material	Type	Weight
Condenser Water Piping to 3"	Steel ASTM A53 Grade B	Black	Schedule 40
Drain Systems (Cooling Coil Drains)	Hard Temper Copper ASTM B42	Copper	Type "L"

e. Fittings: (Ratings based on Working Steam Pressure, WSP and Water Working Pressure, WWP.)

1. Condensate drain systems - wrought copper, solder.

2. Condenser water system - steel, welded, Class 300.

f. Pipe Unions:

1. Malleable iron, screwed, ground, joint brass seats; 175 psig for pipe 2" size and smaller. Galvanized for use with galvanized pipe 2" and smaller.

g. Valves:

1. Gage, plug and check valves: All valves shall conform to Working Steam Pressure ratings specified for fittings under this Section. For cold water systems (WWP as indicated for fittings). Valves as manufactured by Crane, Stockham, Walworth, Jenkins, or as approved. Crane figure numbers used below as a comparison of type specified:

Type	Working Pressure (PSIG)	Size	Material
Gate	175 WSP	Up to 2-1/2"	Bronze
Plug	175 WSP	Up to 2-1/2"	Bronze
Check	175 WSP	Up to 2-1/2"	Bronze

h. Pipe Sleeves:

1. Provide for all pipes passing through floors, walls, partitions, concrete beams and girders and sleeves, types as scheduled below, of adequate diameter to allow a minimum of 3/4" clear all around between sleeve and pipe. When piping is required to be insulated, insulation shall pass continuously through the sleeve with 1/2" clearance between insulation and sleeve.

2. Non-Fire Rated Walls & Floor Penetrations: Sleeves shall be Pipe Shields, Inc. "Adjust-To-Crete", or approved equal, 24 gauge minimum galvanized sheet metal as scheduled below. "Adjust-To-Crete" Fig No. used for reference:

Drywall	#11
Concrete or masonry walls & concrete beams	#100
Concrete floor	#10
Concrete floors with metal underdeck (tack weld to deck)	#2

3. Fire Rated Wall & Floor Penetrations: All pipes penetrating fire walls and floors shall be encased in adjustable or fixed length metal cans, minimum 24 gauge, sized for maximum 1" spacing between insulation and can. Insulation shall consist of 360 waterproofed calcium silicate insert sized to extend to a minimum of 1" beyond wall or floor penetration. Calcium silicate insert shall be the same thickness as the adjoining pipe insulation. Spacing between shield and can shall be packed on either end with double neoprene coated asbestos rope positively fastened.

i. Floor and Ceiling Escutcheons:

1. On all exposed pipes passing through floors, walls, partitions, plaster furring, etc., provide 1" split-type steel plates. In finished rooms, plates shall be nickel-plated; in unfinished room, plates shall be prime coated. Plates shall be similar to Grinnell No. 10.

j. Hangers, Anchors and Concrete Inserts:

1. Furnish and install suitable and substantial hangers, anchors, inserts and supports for all piping as specified herein, and as required. Submit locations of all supports and hangers. All figure numbers indicated herein are Grinnell Co., or as approved.

2. Horizontal copper piping shall be supported in accordance with the following schedule:

Pipe size	Rod Diameter	Maximum Hanger Spacing
1" & smaller	3/8"	6'
1-1/4" to 2"	3/8"	9'
2-1/2" to 4"	1/2"	10'
6" and Larger	1/2"	12'

3. No piping shall be hung from other piping, service, or ceiling hangers. In no case shall hangers be supported by means of vertical expansion bolts.

4. Furnish and install approved roller supports, floor stands, wall brackets, etc. for all lines running near the floor or near walls, which can be properly supported or suspended by the floors or walls. Pipe lines near wall may also be hung by hangers carried from approved wall brackets at a higher level than the pipe. Grinnell Company pipe rolls Fig. 181, and wall brackets Fig. 195.

5. Piping hangers, supports, anchors and guides shall have a built-in safety factor of five (5); in conformance to the latest ASA code for pressure piping. All hanger specialties shall be furnished with zinc chromate prime paint finish.

k. Strainers:

1. "Y" Type: Strainers shall be the same size of pipe lines in which they are installed. Strainer bodies shall be heavy and durable, and shall be constructed of bronze. The bodies shall have arrows clearly cast on the sides to indicate the direction of flow. Each strainer shall be equipped with an easily removable cover and sediment basket. The basket shall be made of monel, not less than 0.025" thick (22 gauge), with approved size perforatins of sufficient number to provide a net-free area through the basket of at least four times that of the entering pipe. The flow shall be into the basket and through the perforations. The basket shall seal against machined seat both in the body, and at the lap. The lap shall have a gasket seal between it and the strainer body. Strainers shall be as manufactured by Bailey, Illinois, Crane, Mueller, or Warren Webster. provide valved blow-off with threaded hose connections at each strainer outleet, size to match strainer taps. Body pressure ratings shall be in accordance with working pressure for systems of this Section. Water Systems: 1/16" perforations.

l. Water System Balancing:

1. Provide necessary piping and connections for balancing all water systems. Operate water systems at full flow and perform necessary adjustments and balancing to deliver water quantities to all system components as scheduled on the drawings.

2. Water system balancing shall be performed by Contractor's representative or accepted by balancing *firm. Submit evidence of qualifications.* All water tests and balacing shall be conducted in the presence of the Owner's representative.

3. Contractor shall submit water balance data sheets and reports which tabulate test data of final adjusted system conditions including design quantities for all water system components. Tabulation shall include measured quantities and calculated quantities which are derived from the measured readings including flow rate GPM, suction and discharged head pressure, TDH, amperage, brake horsepower, RPM, and also the designed quantities relating to these conditions.

4. Provide automatic air vents with gate valves at all high point of water system which will be valved off by this Contractor after system has been intially purged.

HV-5 DUCTWORK - PRODUCTS

a. All ductwork, register boxes, dampers, and all auxiliary work and products of any kind necessary to make the various air conditioning and ventilating systems of the building complete and ready for satisfactory operation, shall be furnished and installed.

b. All ductwork indicated on drawings is schematic. Therefore, all offsets, drops, rises in duct runs, changes in duct sizes and/or locations shall be made where necessary to conform to space conditions or obtain maximum headroom conditions without additional costs to the Owner.

c. Dimensions given on drawings of all acoustically lined ducts shall be clear inside dimension. For example: increase sheet metal duct size by 2" in each direction to accommodate 1" of acoustic lining.

d. A snap-lock seam shall not be permitted. Drive slip shall not be permitted except on break-a-way connections and ducts whose largest dimension is less than 12".

e. Use gasketed type joint when dissimilar metals are joined.

f. All galvanized ductwork shall be hung with galvanized hangers in accordance with the latest SMACNA, ASHRAE, and Code requirements.

g. Access doors shall be provided in all ductwork for access to fire dampers, air valves, automatic dampers and coils, filters, fans, and other products which require access.

h. Unless otherwise noted, all ductwork shall be substantially built of lock-forming quality galvanized steel having a galvanized coating of 1-1/4 ounces for both sides of 1 sq. ft. of a sheet. Ducts shall have approved joints and seams smooth on the inside, with a neat finish on the outside. Flush seams for all exposed ductwork. Duct joints shall be air-tight, with laps made in the direction of air flow, and no flanges projecting into the airstream. All angles should be galvanized. Air tightness shall conform to the Energy Code. If existing ductwork is re-used it shall be appropriately sealed against leakage and guaranteed as new!

i. Tapers for low pressure ducts shall be constructed in accordance with ASHRAE standards. When a taper is used in a"diverging" airflow and the duct size is increased, the sides are to be pitched to maximum of 5:1, except if shown greater to prevent turbulence.

j. Where space conditions permit, full radius turns shall be used at offsets in low pressure ducts.

k. Elbows shall be constructed in accordance with ASHRAE Standards. Where space conditions permit, standard radius elbow (R:W) shall be used. Where space conditions do not permit, a square elbow shall be outfitted with turning vanes. Detail of turning vanes as shown on drawings.

l. When it is impossible to offset a low pressure duct around an obstruction, or when it is necessary to make provision for vertical hangers on the ceiling construction passing through ducts, the obstruction shall be encompassed with a "streamliner" installed in accordance with ASHRAE recommendations.

m. Balancing dampers shall be provided in each branch split or tap connections of low pressure ducts and within return air mains near shaft, whether or not noted on plans. Quadrant dampers shall be furnished and installed in locations shown on plans. All dampers shall conform to SMACNA standards.

n. Exact dimensions of air outlet boxes to conform to submitted outlet sizes. Exact positions shall be submitted, otherwise any changes directed after installation shall be made without additional cost to the Contract Documents.

o. All longitudinal seams shall be sealed with 3M red duct sealant in the sheet metal shop during fabrication. All transverse joints shall be sealed with 3M red duct sealant (applied by brush) in the field. (Note: Where TDC, Ductmate or other approved mechanical, gasketed joint is used, no additional sealing is required).

p. Runout (branch duct) to be routed as high as possible with extended collar to air outlet.

HV-6 LOW PRESSURE DUCTWORK

a. Sheet metal gauges, transverse joint type and spacing, reinforcing type and spacing, in accordance with the latest ASHRAE and SMACNA Schedules for low pressure ductwork, except no ductwork less than 24 gauge is acceptable. Longitudinal seams Pittsburgh Lock. Seal transverse joints and longitudinal seams with non-hardening sealant (3M "Red") or 4" wide hard cast tape.

b. Ducts exposed in occupied areas, other than mechanical and fan rooms fabricated with hemmed "S" slips. Reinforce joints of ducts over 30" wide with flat bars or flat bars and 3/8" rods for ducts over 54" wide. Top joint with bar skip under 31" with and reinforced bar skip for 31" and larger in width.

c. Cross break or bead each duct section on four sides of ducts over 17" in largest dimension. Install 3/8" stay rods in ducts over 72" at each transverse joint. Spacing between rods or rods and side of duct shall not exceed 48".

d. Turning vanes as detailed on drawings and to conform to SMACNA Standards installed with first vane tight in outside corner and last vane no less than one vane space from throat or inside corner. Secure both sides of runners to top and bottom of duct at both ends, and 6" on center with sheet metal screws or rivets.

HV-7 ACCESS DOORS IN SHEET METAL WORK

a. Wherever necessary in ductwork, casings or sheet metal partitions, provide suitable access doors and frames to permit inspections, operation and maintenance of all controls, fire dampers, motorized dampers, filters, bearings, traps, or other apparatus concealed behind the sheet metal work. All such doors shall be of double construction of not less than No. 20 gauge sheet metal, and shall have sponge rubber gaskets around their entire perimeter. Doors in insulated ducts or insulated casings shall have rigid fiberglass insulation between the metal panels. Ventlock or as approved for low pressure ductwork. Medium pressure similar to low pressure access doors with frame fastened to ductwork with sheet metal screws sealed air-tight with sealing compound.

b. All access doors in sheet metal ducts shall be hung on heavy flat hinges and shall be secured in the closed position by means of cast zinc clinching type latches. Where space conditions preclude hinges, use four (4) heavy window type latches. Doors into ducts shall, in general, not be smaller than 18" by 18", except for access doors to fire dampers which will depend on size of fire damper.

c. In no case shall access to any items or equipment requiring inspections, adjustments, or servicing require the removal of nuts, bolts, screws, wing nuts, wedges, or any other screwed or loose device.

d. Plenum Access Doors: Fabricated as detailed on drawings with Ventlock or approved equal, #370 hinges (3), #310 latch and door pulls (2 each), and #286 3/4" x 1/4" felt gasket.

HV-8 FLEXIBLE DUCT CONNECTORS

a. All fan and air supply unit connections, both at inlet and discharge, shall be made with woven cloth, so as to prohibit transfer of vibration from fans to ductwork connecting thereto, without air leakage. Material between the clamps shall have sufficient slack so as to prevent tearing due to fan movement.

b. Vent fabrics, 24 gauge metal, edged 30 oz. or as approved.

HV-9 DAMPERS

a. General:

1. Provide adjustable dampers necessary for proper control and balancing of air distribution. Furnish dampers in all branches, with operating levers readily accessible. No damper greater than 48" long. For greater lengths, provide dampers in equal sections as required.

2. Same material as ductwork, except as otherwise specified. Rigid construction, free of all rattling and vibration, with edges crimped or creased for stiffness.

3. All dampers shall have through-rods, not less than 3/8" diameter fastened to blade with 2 or more yokes with set screws, with steel washer at each end of damper rod.

4. Damper blades are to be two gauge numbers heavier than ductwork in which they are to be installed; 18" gauge and lighter shall have both edges double hemmed. Blades longer that 35" shall have "V" crease in middle to receive damper rod.

5. Dampers shall have through damper rod with #14 gauge bearing plate at one end, and quadrant and lever with lock screw at the other end.

6. On insulated ductwork, mount quadrants on metal saddles finishing flush with insulating surface.

7. Dampers less than 17" wide can be single blade; 17" and wider shall be multi-blade. Where splitter dampers are not desirable for air balance, branch dampers shall be used.

8. Provide teleflex cables for remote damper operation as required.

b. Multi-Blade Dampers: opposed blade type, and shall comply with requirements for single blade dampers. All damper rods, linked together to operate as a unit.

c. Splitter Dampers: provide for air adjustment in throats at duct branches. Rigid construction, securely held in adjusted position with adjusting rod connected to leading edge of damper and protruding through duct; hinged connection at damper and lock screw fitting connection at duct face. On insulated ductwork mount lock screw fitting so that lockcrew is located outside insulation. For each

splitter damper provide sufficient number of adjusting rods to prevent vibration or loosening of adjusted position. Length of splitter, at least equal to width of branch throat served, or as detailed on the drawings.

d. Fire Dampers:

1. Provide fire dampers with access doors installed where shown, and as required by all local codes. In general, fire dampers are required where ducts pierce fire rated floors, walls, and shafts.

2. Fire dampers shall be equal to Air Balance, Inc., Model No. 119, Type B or Type C, or as approved, for rectangular and round ducts. Dampers shall meet the requirements of NFPA Bulletin No. 90A, and shall be tested in accordance with U.L. 555 Test Criteria for Fire Corrosion and Dust Loading, labeled and listed by Underwriters Laboratories.

3. Fire dampers shall be installed as detailed on the drawings with retaining angle iron frames and break-away-connections.

e. Provide motorized dampers on all outdoor air intake and discharge ductwork. Dampers to be interlocked with respective air conditioning units.

f. Provide smoke dampers as indicated on design documents. Dampers shall be Leakage Class I (4 cfm/sq. ft. at 1" w.g.) qualified under UL 555S and shall bear UL label. Dampers shall be constructed of aluminum with silicone blade seals designed for 450^{0}F. Dampers shall be pneumatic operator type as manufactured by RUSKIN Model SD50.

HV-10 DUCTWORK INSTALLATION

a. Install ductwork in accordance with approved shop drawings and conditions at the site.

b. Ductwork installation shall permit installation of other required services without piercing, crimping, or reducing duct sizes.

HV-11 AIR SYSTEM BALANCING, TESTING, & ADJUSTMENTS

a. Upon completion of the air system installation, perform air system balance in accordance with the Standards of American Air Balance Council under the witness of Owner's representative.

b. Submit Air Balance Reports, including design and actual quantities for each product, including fans, air outlets, etc.

c. Air balancing firm or representative must be qualified and submit evidence before engagement.

d. Air balance and adjustments shall be provided until acceptable to the Owner's representative.

e. Balance all supply, return and exhaust systems to the quantities indicated on the drawings with following tolerances:

1. Fans - Design volume plus 5%.
2. Leakage - 3% maximum.
3. Outlets - Design volume plus 5%.

f. Add volume dampers as required for final balancing.

g. With regard to base building air balancing, the intent is to open the variable volume terminals to their fullest extent. The drawings indicate the maximum air quantities we can expect the box to deliver.

h. After the boxes fully opened, take readings at the diffusers with a Velometer.

i. Should the air quantity actually being delivered be less than designed, each air outlet connected to a particular VAV box shall receive an equal percentage of the total air quantity being delivered to the box.

j. Perform balancing before and after move-in.

HV-12 CEILING SUPPLY DIFFUSER

a. Square, steel for surface mounting in ceiling, multiple flared discharge member, round inlet neck, detachable snap-in inner assembly, equalized deflectors and louver dampers. (Refer to ceiling diffuser schedule for exact sizes.)

b. Air discharge pattern - 1, 2, 3 or 4-way.

c. Titus - TMS

d. Refer to Architect for diffuser color and for coordination with ceiling type.

HV-13 RETURN GRILLES

a. Design grilles for lay-in applications flush mounting in ceilings, 24" x 12" module as shown on drawings unless otherwise noted.

b. 20 gauge steel construction.

c. Titus or approved equal.

d. See Architectural drawing for different ceiling constructions.

HV-14 INSULATION

a. General

1. General: Provide insulation in accordance with the Contract Documents and to include:

a) Piping Work Insulation
b) Ductwork Insulation

2. Related Work Specified Elsewhere

a) Insulation for Plumbing Work

b. Requirements of Regulatory Agencies

1. Insulation shall comply with the New York State Energy Conservation Construction Code for all provisions herein.

2. Insulation shall comply with the New York City Building Code for Fire Resistance Ratings.

c. Standards

1. Except as modified by local governing codes and the Contract Documents, comply with the provisions and recommendations of: ASHRAE, SMACNA, ASTM, NFPA, and UL.

d. Requirements

1. Air Systems

a) Insulate all outdoor air ductwork, fans, casings, and plenums.

b) Insulate all conditioned supply air ductwork.

c) For any ductwork, air handling unit panel and plenums which is specified to be acoustically lined, either the full or partial requirement for insulation may be substituted by the thermal rating benefit obtained from the acoustical lining.

2. Piping Systems

a) Insulate all refrigerant piping.

b) Insulate all condensate piping, and all system equipment.

c) Insulate all hot water heating piping.

e. Fire Resistance Ratings

1. All insulation, vapor barriers, adhesives, mastics and related materials shall be of non-combustible materials to meet Code, and with UL flame spread rating of 25 maximum and smoke developed rating of 50 maximum.

2. Adhesives and mastics ratings shall be based on test of bulk material to meet Code, and a maximum burning in accordance with RS14-11, ASTM-E84 Test Methods.

f. Manufacturers

1. Insulation Manufacturers: Johns-Manville, Owens-Corning, Gustin Bacon, Armstrong, or as approved.

2. Adhesive Manufacturers: Benjamin Foster, Insulcoustic, Minnesota Mining, Tuff-Bond, Zeston, or as approved.

g. Piping Work Insulation

1. Thermal Resistance "R" Rating: minimum insulation thicknesses specified herein are based on R rating of 4.0 per inch of thickness on a flat surface at a mean temperature of 75 F. The minimum insulation thickness shall be increased for materials having R rating less than 4.0, or may be reduced for materials having greater than 4.6 in accordance with Energy Code determinations.

h. Fibrous Glass Insulation

1. Shall be used for all piping work except where otherwise specified.

2. Sectional moulded fibrous glass pipe covering permitting snap-on installation.

3. All-service jacket meeting flame resistance ratings of the Code, UL, and NFPA.

4. Blanket fibrous glass material for fittings and valves.

i. Fittings, Valves, and Pipe Connections

1. Pipe Connections: butted insulation sections shall be joined with 4" fire retardant vapor barrier strips and adhesive similar to Benjamin Foster 30-35, or as approved.

2. Concealed Fittings and Valves: blanket type insulation with Foil Skim Kraft (FSK) facing. Seal ends with Benjamin Foster 30-35 and 30-36 for hot piping, or as approved.

3. Exposed Hot Fittings and Valves: blanket type insulation with polyvinyl chloride covering similar to Johns-Manville "Zeston". Seal ends with Benjamin Foster 30-36, or as approved.

4. Exposed Cold Fittings and Valves: same as for hot above, except Benjamin Foster 30-35 to seal the ends.

6. Minimum Thicknesses (Based on R = 4.0 per inch Rating)

System	Pipe Size	Minimum Thickness
Drain Piping	1" & less	3/4"
Steam Water Piping	1" & Less/1-1/4" & Up	1"/1-1/2"
Condenser Water Piping	All	1"

j. Ductwork, Fan, Insulation:

1. All required duct insulation per Energy Code shall have minimum R = 3.5 rating.

2. Concealed Ducts: flexible fibrous glass insulation, 1-1/2", 3/4 lb. minimum density with reinforced aluminum foil-faced flame resistant vapor barrier similar to Johns-Manville "Microlite". May be used for circular ducts when in exposed areas. Rigid insulation per paragraph below may be used for concealed ducts.

3. Exposed Ducts & Plenums: rigid board fibrous glass insulation, 1-1/2 inch thickness, 6 lb. minimum density with aluminum foil-faced flame resistant vapor barrier factory applied, similar to Owens-Corning Type ED-75. Facing pinned and taped in place.

4. All outdoor air ductwork to be insulated.

k. Installation

1. Insulation shall be installed on piping systems after the field testing of piping to avoid damage. Failure to comply is at no added expense to Contract Documents.

2. Pipe hanger shields and high density insulation shall be provided at hanger guides and pipe supports to implement pipe expansion and prevent damage to pipe and insulation.

HV-15 ACOUSTICAL INSULATION

a. Provide internal duct insulation 25 feet upstream and downstream of air conditioning units, 10 feet downstream of all FPV, VAV boxes and where indicated on the drawings, and internally insulate all casings. Apply insulation on all interior surfaces. Duct sizes on drawings are clear inside dimensions.

b. Apply insulation with faced surface exposed to the air stream. Fasten insulation to interior of ducts and casings with adhesive and welded pin or clip fasteners spaced a maximum of 16" on centers. Caulk butting edges of insulation to form a smooth surface with no raw edges exposed.

c. Provide one layer of 5/8" gypsum board, permanently fastened to all exterior surfaces of air conditioning units cabinet. Air conditioning units servicing panels shall still be removable without interference.

d. Aero-Flex ductliner by Owens-Corning as strandard; 1" thickness.

HV-16 AUTOMATIC TEMPERATURE CONTROLS

a. The automatic control system shall be complete with all necessary sources of electricity, pneumatic air, sensors, controllers, relays, switches, transformers, and interconnecting wiring sensors and devices to control the system in accordance with the sequences specified. The controls shall be pneumatic except for supplemental heat pump units which shall be electric. This contractor shall furnish and install all automatic temperature controls, including all wiring for same, where required.

b. Include all necessary motor control and interlock wiring to achieve the required sequence of operation.

c. Furnish to owner a copy of the as-installed control system mounted on 1/2" Masonite and covered with heat bonded clear plastic laminate.

d. Install controls so that adjustments and calibrations can be readily made.

e. Mount surface mounted control devices on brackets to clear the final finished surface of insulation.

f. Conceal control conduit in all spaces except in the mechanical equipment rooms and in unfinished spaces. Install in parallel banks with all changes in directions made at 90 degree angles.

g. Room thermostats shall be of the concealed adjustment type with concealed indicators. Unless otherwise noted, install wall mounted thermostats 5'-3" above the floor measured to the center line of the instrument. Mount switches at same height as light switches. Refer to Designer's drawings.

h. Install control valves horizontally with the power unit up.

i. Electric controls shall be low voltage type. Control wiring shall be stranded copper minimum No. 14THW terminated in an appropriate lug and installed in conduit.

j. Submit shop drawings as prepared by automatic temperature control manufacturer.

k. All thermostats shall be calibrated and level.

HV-17 CONTROLS (SUBMITTALS REQUIRED)

a. Sequence of operation and flow diagrams for all control systems.

b. Catalog data for all control sensors, relays and devices.

c. Equipment catalog and performance data.

HV-18 CONTROL CONTRACTOR

a. All work included under this Section shall be provided by the Control Contractor. The Mechanical Contractor shall retain the services of the listed approved Contractors to perform all control work.

b. Acceptable Control Contractors: Honeywell.

HV-19 CONTROL MOTORS

a. Furnish for all the motorized dampers as specified under this Section, and shown on the drawings.

Electric Type

Control motors shall be electric operated as shown on drawings of sufficient power to ensure tight closing against system static pressure. Voltage and power requirements of the electric operated motors shall be low voltage type with built-in transformer and shall be coordinated with electrical sections of this contract documents.

b. Control motors as manufactured by the Control Contractor, or as approved.

HV-20 TEMPERATURE CONTROLLERS

a. General: All temperature controllers and thermostats shall be compatible with the control system (pneumatic or electric type). Proportional type thermostats and with adjustable throttling range except where control sequence does not permit. Thermostats and controllers shall operate control motors and dampers with a graduated motion holding intermediate position to maintain accurate temperature settings within one degree of temperature.

b. Room Air Thermostats: Shall be encased in metal cover with finish and type as directed by Designer to match those on other floors. Key operated type for adjustment. Dials calibrated in equal increments of temperature scale. Thermostats of minimal dimensions, without thermometers, rapid response, and of highest quality are required.

HV-21 FOUNDATIONS AND VIBRATION ISOLATION

a. Provide vibration isolation to all ceiling hung equipment as specified in this specification.

b. The vibration isolation systems shall be guaranteed to have the deflection indicated on the schedule of this section. Mounting sizes shall be determined by the mounting manufacturer, and the sizes shall be installed in accordance with the manufacturer's instructions.

c. The installed vibration isolation systems for each ceiling supported equipment shall have a maximum lateral motion under equipment startup or shutdown conditions of 1/4". Motions in excess shall be restrained by approved spring type mountings.

d. Where steel spring isolation systems are described in the following specifications, the mounting assemblies shall utilize bare springs with the spring diameter not less than 0.8 of the loaded operating height of the spring.

Each spring isolator shall be designed and installed so that the ends of the spring remain parallel. The spring deflection before becoming solid shall be at least 50% greater than the specified minimum deflection.

e. Shop Drawings: Vibration isolation equipment submittal drawings shall include the isolation mounting deflection, the spring diameter, the compressed spring heights at rated loads, the solid spring heights, and the equipment operating speed.

f. Manufacturers: Vibration isolation manufacturer to be one of the following or as approved:

1. Mason Industries, Inc. - (M.I.I.)
   Hollis, NY

2. Vibration Eliminator Co. - (V.E.C.)
   Long Island City, NY

3. Vibration Mounting & Controls, Inc. - (V.M.C.I.)
   Butler, NY

4. Amber-Booth - (A.B)
   Hollis, NY

5. Korfund Dynamics Corp. - (K.D.C)
   Westbury, NY

6. VICO - (V.)
   New York, NY

g. Deflection (minimum) shall be as specified.

h. Verify that all installed isolators and mounting systems permit freedom of equipment motion in all directions.

i. Isolate water piping with spring/elastomer hanger isolators with a minimum static deflection of 1".

Type DHHS - M.I.I.
Type SNRC - V.E.C.
Type RSH - V.M.C.I.

HV-22 MOTORS AND STARTERS

a. Provide all necessary contacts, relays and switches for motor operation in accordance with the control system sequences and safety device operation.

b. All starters, pushbuttons, signal devices and motor controller equipment shall be NEMA Standards.

c. Provide a nameplate at each control unit indicating the equipment it controls.

d. All motors shall be general purpose, Class B insulation, continuous duty, 40 C ambient, single or multiple speed.

e. All motors shall have a 1.15 minimum service factor.

f. Single speed motors shall operate at 1,750 rpm.

g. All motors shall have a terminal box, appropriate mounting base, and a ground post for connection of a ground conductor.

h. Starters for motors shall be unfused disconnect and magnetic across-the-line starter in an enclosure. The cover shall be capable of being padlocked in the open position. Enclosure shall be NEMA 1 for dry locations, NEMA 3R for wet or outdoor locations. Allen Bradley 712-713.

HV-23 CONTROLLED INSPECTION AND EQUIPMENT USE PERMITS

a. This contractor is responsible for contracting an independent professional engineer to perform the controlled inspection as per New York City Code guidelines and complete all required documents for the Equipment Use Permits. All documents must be forwarded to the filing consultant for submission to the Building Department in order to complete the project file before an inspection can be completed. Submit the qualifications of the independent professional engineer to the Owner and Architect for review.

HV-24 SEQUENCE OF OPERATION - AC UNITS

a. Air conditioning unit with its associated equipment shall stop/start as scheduled. An electronic seven-day programmable thermostat with time clock and manual override will stop/start AC unit.

b. On a signal from the time clock the AC unit will start.

c. Room thermostat shall cycle unit and refrigerant pressure will modulate condenser water control valve to maintain its setting. Controller will cycle hot gas heat and humidification mode automatically to maintain set point.

HV-25 SEQUENCE OF OPERATION - EXHAUST FAN (EF-1)

a. Exhaust fan unit EF-1 shall stop/start through the wall mounted thermostat.

NEW YORK SOCIETY OF SECURITY ANALYSTS (NYSSA)
One World Trade Center
44th Floor
New York, NY
RDA No. 655.041.00

ELECTRICAL SPECIFICATIONS

E-1 GENERAL

a. All work in this section is subject to General and Supplementary Conditions of these Specifications.

E-2 SCOPE

a. Include all labor, materials and appliances required for the furnishing, installing, and testing, complete and ready for operation in a manner satisfactory to the Owner, all herein specified, including in general, the following:

1. Light and power wiring, conduit and raceway.
2. Lighting fixtures and lamps, including electronic energy saving ballasts eligible for Con Edison Rebate.
3. Wiring devices and relays
4. Grounding
5. Receiving and setting of equipment
6. Removals and relocations
7. Temporary light and power
8. Cutting, patching and related work
9 Protective devices, circuit breakers, and lighting panels
10. Installation of conduit stub-ups and J-boxes for the CCTV Security System, and supply of power.
11. Audio/Visual System.
12. Dimming System.
13. Connection to underfloor cellular raceway system.
14. Protection and re-installation of existing Class E Alarm Devices. Furnish and installing new fire alarm devices, audio/visual alarms and wiring back to the building data gathering panel.
15. Empty telephone and data conduit system.
16. Grounding of the raised floor as per drawings and this specifications.
17. Fill-in and filing with the fire and building departments all necesary forms for fire alarm (Class "E" work). The following forms shall be included: Form A433 and A-45B.
18. As Built Drawings

b. The following work shall not be included:

1. Supplying motors and motor controllers and controls, except as otherwise noted.
2. Finished painting
3. Installation of access doors
4. Installation and termination of telephone and data cables
5. Furnishing and installing the Electronic Key Access and Security Systems except as noted above.

E-3 MARKING AND CIRCUIT IDENTIFICATION

a. All panels, load centers, etc., and the circuits therein, shall be marked. All circuits originating from these identified sources shall be identified by the Contractor at all disconnect switches, circuit breakers, motor controllers, junction and pull boxes, etc.

E-4 ACCESS DOORS

a. Furnish access doors to the General Contractor for installation by him, where required in finished walls, partitions, etc., for access to junction boxes, controls, etc., concealed behind finished construction. Submit cetting drawings showing locations for Architect's approval.

b. Door shall be 20 gauge steel sandwich type, insulated with continuous hinge and flush cylinder lock. Doors not less than 12" x 12" for hand access.

c. Construct frame of 16 gauge steel with four masonry anchors per door. Door shall be Milcor "fire rated access door".

E-5 ELECTRICAL TESTING

a. Provide all necessary meters, instruments, temporary wiring and labor to test and adjust all equipment and wiring installed and/or connected under this Contract, including electrical equipment furnished by others, to determine proper polarity, phasing, freedom from grounds and shorts and operation of equipment. All measuring instruments must be properly calibrated.

b. Whenever any authorities having jurisdiction require that any work be tested or approved, Contractor shall provide proper facilities for access and for inspection.

c. Check all lighting fixtures and receptacles for proper operation.

d. Motors:

1. Make the following tests on all motors before starting up:

a) Check motor nameplate for horsepower, speed, phase and voltage.

b) Check all bearings to see if they are properly filled with oil or grease.
c) Check coupling alignment and shaft end play.

2. Make the following tests on all motors during or immediately after start-up:

a) Check shaft rotation. Check bearing temperature. Check motor for smooth operation.
b) Take a current reading at full load using a clamp-on ammeter. If ammeter reading is over the rated full load current, determine the reason for the discrepancy and take the necessary corrective action.
c) Following established procedures, equipment shall be energized after certifications by the Contractor that the installation is satisfactory. All motors and equipment shall be tested for power operation.
d) Overload elements in motor starters shall be adjusted and checked for suitability to the motor characteristics. Contractor shall replace any overload element that is inadequate. The cause of any motor operating above full load rating should be investigated and the cause removed instead of increasing the overload relay trip rating. These final operational tests shall determine that the installation is correct.

e. After completion of adjusting, take current readings at full load using a clamp-on ammeter and submit to Engineer for review and approval.

f. Check all system and equipment grounds for proper value of resistance using the Megger ground tester in accordance with manufacturer's standard instruction. Test insulation resistance of all new and affected existing feeders prior to energizing.

E-6 PHASE BALANCING

a. Balance, as equally as possible, the loads connected to each phase of all circuits connected to panelboards.

b. At the completion of the work, check the load current in each phase of each feeder and make such adjustments as are necessary to correct load imbalance. Maximum imbalance shall not exceed 10%.

c. After all adjustments are made and the premises are fully occupied take current readings on each phase at the feeders to the panelboards using clamp-on ammeter. The readings should be taken for 30 minutes at full load (all fans, pumps, air condition units, etc. should run at full capacity) during normal working hours. Submit the readings to the Engineer and to the Building Management for review and approval.

E-7 SHOP DRAWINGS AND SAMPLES

a. Prior to shipment of equipment or start of installation of system components, submit the following for approval:

1. A complete detailed set of construction drawings for equipment and systems, indicating dimensions, materials of construction and methods of assembly.

b. Whenever items or class of material is specified exclusively by trade name, manufacturer's name or by catalog reference, use only such items unless prior written approval for substitution is secured. When applying for substitution, state credit or extra involved and provide all necessary supporting data.

c. Provide submittals and/or shop drawings on the following equipment, devices, etc.:

1. Circuit breakers, disconnects and enclosures
2. Circuit breaker panelboards
3. Grounding devices - all types
4. Safety switches
5. Fuses - all types
6. Transformers for non-linear loads
7. Wire - all types
8. Wiring connectors and splicing devices
9. Conduit and conduit fittings
10. Pull boxes
11. Wiring devices including switches, receptacles, and dimmers
12. Lighting fixtures, lamps, ballasts, including electronic energy saving ballasts
13. Afterset inserts

E-8 RACEWAYS

a. Conduit - General

1. Conduit sizes shall be in accordance with New York City Electrical Code.

2. The types of conduits used shall be as described below under "Conduit Types."

3. Conduit Types:

a) Exposed indoors, concealed in hung ceilings under raised floor or in block walls: Aluminum rigid conduit or EMT.

b) Lighting, receptacle and appliance branch circuits concealed in hung ceilings, or in metal or dry wall stud partitions: Aluminum rigid conduit or EMT (up to 1" maximum)
c) Concealed in concrete, exposed outdoors and in damp locations indoors: Rigid hot dip galvanized with non-corrosive fittings.
d) Flexible conduit where rigid is not feasible, short lengths only.
e) All others not shown or specified and all conduit larger than 1" trade size: Rigid Aluminum.
f) Homeruns from panel to first box must be in rigid conduit.

4. Conduits shall be of such size and shall be so installed that the required conductors may be drawn in without injury or excessive strain.

5. Mechanically join all metal conduit, enclosures, raceways, etc. to form a continuous electric path. Indent fittings are not acceptable. Threaded type fittings only for rigid conduit. Set screw type fittings for EMT. Flexible fittings, compression type secured with wire.

6. Lay out and install all conduit runs as to avoid proximity to steam and hot water pipes. Do not run conduit within three inches of such pipes except where crossings are unavoidable, then the conduit shall be kept at least 1" from the covering of the pipe crossed.

7. In general run conduit to lighting fixtures concealed; in mechanical equipment rooms and fan rooms install conduit exposed.

8. Support riser conduits at each floor level by clamp hangers Kindorf type C-210. Arrange hangers for minimum obstruction of opening when installed in pipe shafts. All conduit openings shall be fire stopped in an acceptable manner.

9. Where physical constraints prevent the use of standard threaded couplings use bolted split couplings as manufactured by O.Z. Gedney.

10. When not terminated in a threaded hub, secure conduits entering sheet metal enclosures and outlet boxes in place by two locknuts (one inside and one outside) and terminate each conduit with a bushing.

11. When running conduits outdoors or in fresh air intake plenums install a compound filled sealing fitting immediately on the warm or building interior side of the wall where conduit enters and/or leaves the above locations. Conduit run in

these cold locations shall slope toward sealing fittings, and away from outlets and devices. Sealing fittings shall be drainable type, Crouse Hinds type EYD or as acceptable, with drains toward cold sides. Install fittings at low points in the conduit system to permit draining of moisture. Where possible, conduits shall enter these locations from below. Terminate all conduits at outlets and devices in these spaces with threaded hubs.

12. Use flexible metallic conduit from outlet boxes in hung ceiling to lighting fixture housings. The final raceway connection to motors, transformers, and other equipment subject to vibration shall be flexible metallic conduit.

    Use aluminum flexible conduit with aluminum rigid conduit, and flexible steel conduit with EMT, IMC or galvanized rigid conduit.

13. Where a flexible raceway is installed in plenums or other indoor locations where exposed to continuous or intermittent moisture, use liquid tight flexible conduit installed in such a manner that liquids tend to run off the surface and not drain toward the fittings. Provide sufficient slack to reduce the effects of vibration.

14. Where flexible conduit is used as a wiring method, to run wiring to new receptacles in existing GYP-Board walls, provide a separate ground conductor. Bond ground wire to the conduit grounding system at the first junction box.

15. All empty conduits, except those which are vertical for their entire length and except conduits connecting ceiling lighting outlets together, shall have a fish wire.

b. Concealed Conduit:

1. Install conduit so as not to cut or run through structural members, except by special written permission of the Engineer or where specifically shown on drawings.

2. Do not run conduits horizontally or crosswise in building type partitions or side walls.

3. Except for branch circuit work install all conduit in hung ceiling on acceptable hangers and inserts. Conduit for branch circuit work and control and instrument wiring shall be supported by clamps or pipe straps supported from the purlins (black iron) members supporting the ceiling where available, or from structural members or from the deck.

4. In lay-in ceilings install conduit and/or armored cable high enough to permit removal of ceiling panels.

c. Exposed Conduit:

1. Run exposed conduit and extensions from concealed conduit systems parallel with or at right angles to the walls of the building, to present a neat and workmanlike appearance.

2. Support rigid metallic conduit runs on each side of bends, and not greater than 10'-0" on centers. All other conduit shall be secured as required by Code.

d. Expansion Fittings:

1. Install conduit expansion fitting in each conduit run wherever it crosses an expansion joint in the structure and wherever the conduit run exceeds 140 feet. Expansion fittings shall be OZ/Gedney type DX, or as acceptable.

e. Conduit Types:

1. Aluminum

a) Aluminum conduit shall conform to ANSI Standard C80.5 and UL Standard #6 for rigid aluminum conduit. Interior of conduit shall have a silicone or as acceptable coating; all threads shall have an application of Pentrox "A" or other acceptable lubricant.

2. Flexible Metallic

a) Flexible metallic conduit shall be threadless, continuous, spirally wound and interlocked, aluminum or zinc coated steel conforming to UL Standard #1 for flexible metal conduit.

3. Liquid Tight Flexible Steel

a) Liquid tight flexible steel conduit shall be similar to flexible metallic except with a PVC jacket. Conduit shall be Anaconda "Sealtite" type UA or as acceptable.

b) CAUTION: When using liquid tight flexible conduit, wiring must be derated to 60 C ratings.

4. Electric Metallic Tubing

a) Electric metallic tubing (EMT) shall be threadless type, steel, conforming to ANSI Standard C80.3 and UL Standard #797, with fused zinc on outside and inside walls with an additional high corrosion-resistant finish coat.

5. Rigid Galvanized Steel Conduit

a) Rigid full-weight steel pipe galvanized inside and out using the hot-dip method. Conduit shall conform to standards for Rigid Steel Conduit of the Underwriters Laboratory, Inc.

b) Zinc coating shall be sufficiently well bonded and elastic to prevent flaking or cracking when a sample of finished conduit is bent 90° with a radius of 6 times the inside diameter of the conduit.

f. Conduit Sleeves:

1. General

a) Conduit sleeves shall be installed so that proper position and alignment will be maintained during construction.

2. Sleeves through Interior Walls and Floors

a) Sleeves through interior walls and floors shall be minimum of No. 20 gauge galvanized steel, black enameled rigid steel conduit or Schedule 40 black steel pipe. Aluminum conduit shall not be used. Where specific sizes are not indicated on the drawings, sleeves shall be sized to provide one-half (1/2) inch clearance around the outside surface of the item for which they are installed. They shall be cut flush with wall surfaces, and shall extend two inches above finished floor levels. The space between conduit and sleeves shall be packed with fibreglas or other acceptable non-combustible packing material to prevent passage of air, liquid or fumes from one area to another. Seal with "Chas Foam" or other acceptable compound.

g. Conduit Fittings:

1. Rigid Threaded Conduit and IMC

a) All bushings for terminating conduit 1" and smaller shall be cast threaded type with smooth edge to prevent injury to wire and cable. Use aluminum bushings for aluminum conduit.

b) Use insulated grounded bushings for conduits 1-1/4" and larger. Insulated grounded bushings shall be cast, threaded type equipped with a lug for grounding. Upper edge shall have a nylon ring or bakelite ring which is

molded into the bushing. Ground lug shall be sized to take conductor sized according to Code with a minimum size of No. 12 Use aluminum locknuts and bushings with aluminum conduit.

2. Thinwall (EMT) Conduit

   a) Where electrical metallic tubing is installed, connectors and couplings shall be concrete tight, die cast zinc, compression type. Connectors shall be of the nylon insulated throat type as manufactured by Steel City Series TC-800 or as acceptable.

3. Flexible Metallic Conduit (Greenfield)

   a) Where flexible metallic conduit is installed connectors shall be the Tite Bite type with nylon insulated throats as manufactured by The Thomas & Betts Co., Series "3110", or as acceptable.

4. Liquid Tight Flexible Steel Conduit (Sealtite)

   a) Where terminating liquid tight flexible steel conduit (Sealtite), fitting assembly shall be sealing type consisting of steel gland, nylon ring and ground cone on the outside and a nylon insulated throat fitting on the inside. Fittings shall be Thomas & Betts Co., Series "5331", or as acceptable.

h. Lay-in Type Wireway:

1. Furnish and install general purpose lay-in type wireway where shown on the drawings. The wireway shall be installed in varying sizes and locations as indicated to provide bridging between various components or equipment. There shall be amply space around the wireway for cover removal and cable installation.

2. Wireway shall be Under writers' Laboratories listed as wireway or auxiliary gutter.

3. Wireway shall be constructed in accordance with Underwriter's laboratories Standards UL 870 for Wireways, Auxiliary Gutters and Associated fittings. Every component including lengths, connectors and fittings shall be UL listed. Provisions shall be included in the construction to allow screwing the cover closed without the use of parts

other than the cover lengths, fittings and connectors. Covers shall be screw-on type, maximum 5'-0" length, with sealing gaskets, and with rounded exposed edges to prevent injury to signal cables which will lie exposed on top of cover.

Wireway shall be constructed without knockouts.

4. All sheet metal parts shall be provided with a rustinhibiting phosphatizing coating and gray baked enamel finish. All hardware shall be plated to prevent corrosion. All screws installed toward the inside shall be protected by spring nuts or otherwise guarded to prevent wire insulation damage.

5. All connectors shall be slip-in type with self-retained mounting screws. All gangers shall be two-piece with hook together feature to permit pre-assembly of wireway and hanger bottom plate before hanging on pre-installed upper bracket

6. All lengths, connectors and fittings shall be Underwriters' Laboratories labeled and installed in accordance with the New York City Code and as shown on these plans. Underwriters' Laboratories listing of lengths without listing of connectors or fittings is not acceptable.

E-9 CONDUCTORS

a. Wire and Cable (600 Volt Building Wire):

1. Unless specified otherwise all wires No. 10 AWG and smaller shall be solid; No. 8 AWG and larger shall be stranded.

2. No wire shall be drawn into a raceway until work of a nature which may cause injury is completed. Use acceptable lubricants.

3. Unless otherwise indicated all control wiring shall be No. 12 AWG. Minimum size wire for power or branch circuit work shall be No. 12 AWG. Use No. 10 AWG wire to the first outlet for branch circuit runs more than 70 feet for 115 volt circuits and 80 feet for 265 volt circuits. All control and circuit wires in cabinets, boxes, panels, full and junction boxes shall be trained neatly and tied.

4. All wires and cables shall be continuous from origin to destination without splices unless written permission is given by the Engineer. In branch circuit wiring, make connections to fixtures or devices using "T" taps only.

5. All 600 volt wire and cable unless otherwise specified shall be single conductor suitable for use in wet and dry locations.

6. All conductors shall be annealed copper.

7. Wire Types: XHHW

8. All wire and cable shall be color coded as follows unless otherwise authorized:

	Color	
Phase	208V/120V AC	480/277V AC
A or 1	Black	Brown
B or 2	Red	Yellow
C or 3	Blue	Orange
Neutral	White	White
Equipment Ground	Green	Green
Switch Legs	Purple	

Where two different voltage systems are run in the same raceway (special situations), use gray or white with a stripe (not green) for one of the neutrals.

9. All cables in indoor dry locations in pull, splice and cable support boxes, in panels and points of termination shall be bundled and laced by circuits and tagged using nylon tiewrap material, flame resisting tags of adhesive material or coded sleeves. Tags shall identify cables and pieces of equipment served. Tags shall be T&B "TY-RAP" or "E-Z Code" or as acceptable. All cables, power and signal shall be routed and trained by system.

10. Tag all cables in interior damp locations with stainless steel, zinc or lead embossed tags secured with tinned copper wire. Tags shall be as manufactured by The Thomas & Betts Co. or as acceptable.

11. Provide cable supports of the threaded metal conduit fitting type with inside tapered, and with a non-metallic insulated tapered plug with cable openings and complete with grounding lug in all pull boxes as required by Code. Support shall be OZ/Gedney type "RL" for steel conduit, and "RLA" for aluminum conduits or as acceptable.

12. On each panel or interconnection box and on the entire system, circuits shall be connected so that the load on each phase shall balance within ten percent with all lamps burning and all equipment in operation.

13. All splices and connections outdoors or in interior damp locations shall be sealed with Minnesota Mining "E-Z Seal" or as acceptable.

b. Connectors: Splices and Taps for 600 Volt Wire and Cable

1. For Wire No. 8 AWG and Smaller

a) Splices and taps shall be pressure indent type with insulated cover; or insulated, rustproofed spring thread-on type. Manufacturer's recommended tooling shall be used. Connectors shall be Buchanan #2008.S or as acceptable.

b) Except where terminating in panelboards, switches, and motor controllers all terminations shall be made with compression lugs. The manufacturer's recommended tooling shall be used to apply. Where compression terminals are not isolated safely from other metallic parts, the nylon self-insulated type shall be used. Lugs shall be Burndy "Insulug" or as acceptable.

2. For Cable No. 6 AWG and Larger

a) Except in motor controllers, switches and in panelboards where lugs cannot be changed, all cables shall be terminated, spliced and tapped with color keyed, double indent compression connectors as manufactured by Thomas and Betts Co., Series 54000 or as acceptable. Manufacturer's recommended tooling shall be used to apply. Lugs shall be the two hole type. Insulate all splices and taps with heat shrinkable insulation, Raychem or as acceptable.

E-10 LIGHT AND POWER MATERIALS

a. General:

1. Outlet Boxes

a) In centering outlets, allow for overhead pipes, ducts, etc., and for variations in arrangement and thickness of fireproofing and plastering, also for window trims, paneling, etc., and any inaccuracy resulting from failure to do this must be corrected without expense to the Owner.

b) Mount outlet boxes for similar equipment in the same or similar areas at uniform heights. Where mounting heights are not indicated, locate outlets as required for the equipment connected thereto. Unless directed otherwise by the Owner or by the drawings the mounting heights to centerline of outlet boxes shall be as indicated by the Architect.

c) Install outlets in accessible locations. Where metal wainscot or finish is removable, install outlets to permit removal of metal wainscot or finish without removing the outlet box.

d) Close all unused openings in outlet boxes with knockout closers.

e) Provide blank plates attached by means of "bridges" on outlet boxes in which no device is installed.

f) Use cast boxes for exposed work.

g) Use stamped steel box, Walker Parkersburg Type 801 LCK or equal where installed flush in floors.

h) Fasten outlet boxes securely. Use hangers to support ceiling outlets, except in lay-in type hung ceilings, where boxes may be supported by the conduit carrying the branch circuit wiring provided the first conduit support on either side of the box is within three feet of the box.

i) All exposed outlet boxes shall be attached to permanent inserts. Where this is not possible the concrete shall be drilled, metal expansion sleeves shall be installed and boxes shall be secured using machine screws.

2. Switches

a) Locates switches near doors at the stride side of doors as finally hung.

b) Switch the ungrounded wires of circuits.

c) Mount switches with the long dimension vertical and the operation handle in the upward position when in the ON position.

3. Pull, Tap and Cable Support Boxes

a) Provide pull, tap and cable support boxes where indicated on the drawings, required by "Codes" and as required to facilitate installing of wire and cables.

4. Isolation of Feeders

a) Completely isolate from one another cables originating from different service takeoffs. Do not place in same enclosures unless suitable and acceptable isolation barriers are provided. This applies to all boxes, cabinets, pull boxes, cable support boxes, etc.

b. Outlet Boxes:

1. Sheet Steel

a) Sheet steel outlet boxes shall be galvanized and complete with galvanized steel cover and/or extension collar as required.

b) Concrete boxes shall be 4" octagon with a removable backplate and 3/8" fixture stud, if required. Depth of box shall allow for a minimum of 1" of concrete to be poured above the backplate.

c) Switch, receptacle and wall outlet concealed boxes shall be a nominal 4" square, 1-1/2" or 2-1/8" deep as required with a raised cover, unless otherwise indicated on the drawing. Provide 3/8" fixture stud as required. Ganged outlet boxes shall be of sufficient length to suit conditions.

d) Lighting fixture boxes shall be 4" octagon with 3/8" fixture stud. For suspended ceiling work, Provide a 4" octagon with removable backplate where required.

e) Junction outlets shall be same as above outlets but without stud, and shall be furnished with covers to suit each condition and as directed.

f) Dimensions shown on drawings take precedence over dimensions called for herein.

2. Cast Type

a) Cast outlet boxes shall be anodized cast aluminum when used with aluminum conduit, type FS or FD, with threaded hubs and matching gasketed covers as required without overlapping edges or corners.

c. Afterset Inserts and Cell Access Fittings

1. Obtain access to existing underfloor ducts for on-cell floor monuments as shown by providing aftersets inserts into active floor cells.

2. Afterset inserts shall be cast, threaded, belled out base units, 2" I.P.S. Heights of inserts shall be determined after pilot opening has been core drilled and the depth of the concrete fill has been verified.

3. Provide locking nipple to attached monuments boxes to floor by screwing into afterset inserts.

4. For off-cell outlet installation use Walker Parkersberg Flat Elbow #H-451.

5. For homerun from wall outlets through floor cell use Vertical Elbow H-453.

d. Wiring Devices:

1. Install to bear evenly and truly, secured on axis of supporting members.

2. Where boxes are back of finished surface, use recess collars and proper length screws, of size to form shoulder at exact point to retain switch in position. Use not wooden wedges, shims or blocks for truing up.

3. Local Wall Switches: Flush toggle, quiet type, and rated 20 ampere, 120/277 volts. Single Pole: Hubbell #1221; threeway: Hubbell #1223.

4. Insertion Receptacles:

a) General Use: Specifications grade, duplex, 15 ampere, 125 volts, 3 pole (third pole "U" shaped grounding). Hubbell 5252. Devices connected to general purpose circuits shall be brown. Devices dedicated for computer use shall be grey.

b) General Use: Specification grade, single 20 ampere, 125 volts, 3 pole (third pole "U" shaped grounding). Hubbell 5361. Devices connected to general purpose circuits shall be brown. Devices dedicated for computer usage shall be grey.

5. Special receptacles as indicated and/or required.

6. Device Plates: As selected by the Architect.

7. Switches and receptacles shall be as manufactured by Hubbell as noted above or approved equal by Arrow-Hart, General Electric, Bryant, or Leviton.

8. Where installed adjacent to dimmers, provide matching Nova T-Star Series Switch by Lutron.

d. Disconnects:

1. General

a) Disconnects shall conform to NEMA and UL Standards, and be installed where indicated and where required by Code. Disconnects shall be horsepower rated units to maximum sized listed by UL.

b) Disconnects shall be located where they are readily accessible and capable of being used without reaching above, around, under, etc., equipment and/or obstructions.

2. Switching Mechanism

a) Provide quick-make, quick-break mechanism with external operating handle mechanically interlocked with enclosure cover to provide normal access to inside of enclosure when disconnect is in OFF position only. Provide means to lock the operating handle in the OPEN and CLOSED position. Designate on the enclosure the OPEN and CLOSED position of the operating handle.

b) Switches shall be of the double stationary contact type.

c) Switches shall be fusible or unfusible as shown on the drawings and/or as required. Fused switches shall be complete with rejection type fuse holders and fuses as required.

d) Each safety switch shall be single-throw, mounted in separate heavy duty industrial enclosure, with arcquenching device on each pole for all disconnects, and with means to bypass the mechanically interlocked door and handle. Switches shall be General Electric "QMR Heavy Duty Type" or as acceptable.

e) All disconnects shall be rated 600 volts.

3. Enclosure

a) In general all switches in indoor, dry locations shall be mounted in NEMA Type 1 enclosures. Outdoors and indoors in damp locations, switches of 200 ampere capacity and less shall be mounted in NEMA 4 enclosures; switches above 200 amperes shall be mounted in NEMA 3R enclosures.

e. Lighting Panelboards

1. Three-phase, 3, 4 or 5 wire, copper bus bars and main lugs or main circuit breaker, with 2, 3, or 4 wire branches, as noted. Quanitity and capacity of panels and circuits as shown on panel schedules. Provide isolated ground bus where indicated on panel schedule. Size neutral bar as indicated on panel schedules.

2. Cabinets: Code gauge galvanized sheet steel with trim and lockable door. Back box and trim to be primed and painted with grey enamel. Lap and rivet corners or form as approved. All panels to be keyed alike. Keys to be cut as directed.

3. Directory Holder: Metal frame with nonbreakable transparent over and directory card. Entries to be typewritten by installer.

4. Panelboard construction for bolted type circuit breakers.

5. 120/208 Volt Panels: Minimum short circuit rating 10,000 amperes, rms symmetrical.

6. 277/480 Volt Panels: Minimum short circuit rating 14,000 amperes, rms, symmetrical.

7. Minimum Gutter Space: For panels with main buses rated over 100 amperes, 5-3/4" minimum on all sides.

8. Panels shall have 3-pole main ciruit breakers and quantity, poles and trip ratings of branch circuit breakers as scheduled.

9. All main and branch bus bars, neutral and ground bus bars, cable lugs and all connectors to be made of copper. Dual rated alloys or aluminum not permitted.

10. All circuit breakers shall have copper lugs, whenever possible.

11. Panels shall have engraved white core, black lamicoid nameplate screwed on to panel trim.

f. Molded Case Circuit Breakers

1. Provide new circuit breakers for existing panels as shown on the panel schedules to conform to the new layout.

2. General characteristics of molded case circuit breakers shall be:

   a) Single, 2 or 3 pole, as noted.
   b) Thermal-magnetic type.
   c) Mechanism: Quick-make, quick,break, trip-free type.
   d) Contacts: Non-welding.
   e) Automatic Tripping: Clearly indicated by handle automatically assuming position distinctive from moral "ON" and "OFF" positions.
   f) Provide shunt trip or GFI type circuit breakers where indicated on the panel schedules.

3. All circuit breakers shall have interrupting capacities adequate for their locations, generally. Unless indicated otherwise, the interrupting capacity of any circuit breaker shall be greater than the let-through current of the

e. Piping shall be installed so as to avoid ducts and electric light outlets and before the installation of same consult with the other trades and facilitate the erection of the equipment.

f. After cutting, all pipes shall be reamed out to full bore and before erection the inside of all pipes shall be thoroughly cleaned.

P-6 MATERIALS - GENERAL REQUIREMENTS

a. All materials shall be new and the best of their respective kinds, suitable for the conditions and duties imposed upon same at the building. Materials shall match existing for similar service except as otherwise noted herein. They shall generally be of representative manufacture. Brand names are specified to indicated a standard of quality only.

P-7 DRAINAGE SYSTEM

a. Waste and vent piping shall be cast iron "no hub" CISPI STD-301-75. Piping shall be supported at every five feet and at every change in direction for horizontal piping. Screw plug clean-outs shall be provided at each change of direction in drainage piping. Joints shall be neoprene conforming to ASTM D15 with stainless steel coupling similar to Breeze Corp. "Clamp-All" high torque.

b. Fixture traps and waste piping exposed to view shall be chrome plated brass.

P-8 WATER PIPING

a. Install new domestic water piping as indicated with hot and cold water connecting to fixtures requiring same as indicated on the drawings.

b. Piping concealed in hung ceiling or partitions shall be copper type "L" ASTM B-88 with cast brass fittings and conforming to requirements to USAS B16.18. Joints shall be brazed joints.

c. Exposed cold water piping shall be standard weight IPS brass pipe, chrome plated.

P-9 HANGERS AND SUPPORTS

a. All piping shall be substantially supported from the building structure. All hangers, rods and supports shall be specifically approved for use intended. Hangers and supports shall be installed in strict conformity with Local Building Code requirements.

b. Where overhead construction does not permit fastening of hanger rods, inserts, etc., in required locations, provide additional steel framing as required and approved.

c. Expansion shields shall be provided to support hanger rods at required intervals. Expansion shields shall be Star Expansion Manufacturing, "Phillips" Anchors, Diamond "Redhead", or Hilti Co.

d. Chains, straps, perforated bars or wire hangers are not permitted.

P-10 VALVES

a. Furnish all valves, of Milwaukee Valve mfg. Company, Jenkins Bros, Walworth or other approved manufacture, as indicated on the plans, or as may be required for the proper control of the pipe lines installed under these specifications, so that any fixture, line or piece of apparatus may be cut out for repair without interference or interruption of the service to the rest of the building. All water valves shall be brass, 125 PSI steam rated. All valves shall be of one manufacture.

b. All gate valves within the building shall be wedge gate valves with painted iron wheel handles, shall have gland followers in stuffing boxes, and shall be so constructed that they may be repacked while open and under pressure. All valves shall have the name of the manufacturer and working pressure cast or stamped thereon.

c. Provide solder to screwed adapters as required.

d. Domestic water valves tabulated herein have been selected from the catalog of Milwaukee Valve Mfg. Company. Valves with corresponding feature as manufactured by Walworth, Crane co. and Jenkins Bros. may be submitted for approval.

Type		Fig. No.
Gate Valves	Sweat End	1145
	Threaded (Bronze)	1105

P-11 AIR CHAMBERS

a. Provide air chambers for all isolated fixture at least 12" high and same size for piping but not less that 1/2".

P-12 INSULATION

a. All new cold and hot water piping, including mains, and branches shall be insulated with 1/2" glass fiber covering

with factory-applied all-service jacket "ASJ", with self-sealing laps, molded fittings, securely wired on with copper wire.

b. Jacket of insulation shall have a flame spread rating of 25 or less, smoke developed rating of 50 or less.

c. Insulation shall be as manufactured by Certainteed or approved equal.

d. All valves, flanges, etc., in insulated piping shall be covered similar to the fittings. Valve handles shall not be covered.

e. Covering shall be continuous through walls and floors.

f. This Contractor shall furnish and install "Insul-Shield MultiPurpose Pipe Saddle" as manufactured by Insul-Cousitc Corp. Insul-Shield shall be installed at each support point when the pipe is erected. The thickness of press-glass support segment shall be equal to the thickness of the adjoining insulation when load is applied.

P-13 PLUMBING FIXTURES AND EQUIPMENT

a. Plumbing fixtures shall be as specified by Architect, furnished and installed under this contract. Provide all necessary P-traps, flush valve, water supplies, angle stops, escutcheons, etc., and make all final connections to new. All exposed trim shall be cast brass chrome plated.

P-14 ESCUTCHEONS AND SLEEVES

a. Where pipes pass through wall, floors or partitions, suitable 16-gauge galvanized pipe sleeves shall be provided and the spaces between sleeves and pipes shall be tightly caulked.

P-15 TESTS

a. When the water the waste piping, etc., installed under this contract has been completed,notify the Engineer and Owner of readiness for inspection and make any and all tests required by authorities.

P-16 DISSIMILAR METALS

a. Connection between dissimilar metals, such as ferrous and nonferrous, shall be isolated by means of a dielectric material such as teflon, micarta or screwed insulating unions or flange unions as manufactured by Epco Sales, Inc., to provide cathodic protection currents and to stop galvanic corrosion.

P-17 SHOP DRAWINGS

a. Submit to the Architect for approval six (6) copies of shop drawings for the following equipment: Piping, insulation, valves.

b. Shop drawings shall include all dimensions, materials and auxiliary equipment.

P-18 VERIFYING CONDITIONS

a. It shall be absolutely mandatory for all bidders to visit the site and inspect all existing conditions firsthand. Arrangements for inspection shall be further confirmed and verified with the Owner.

b. Before starting any work examine existing conditions, and thoroughly check drawings, specifications, adjoining or underlying conditions in which the work of this Section is to be performed, and all dimensions.

c. Report in writing, to the Owner with a copy to the Engineer, any and all conditions which may interfere with or otherwise affect or prevent the proper execution and completion of the work of this Section.

d. Do not commence any work until any and all such conditions have been corrected.

e. Failure to notify the Owner and/or the Engineer of unsatisfactory conditions will be construed as an acceptance of all conditions.

f. Execution of work of this Section Constitutes acceptance of the base or adjoining work and other conditions as satisfactory in every respect and later claims of defects in such cases will not be allowed.

P-19 CONDUCT OF OPERATIONS

a. The building in which work of this contract will be performed in an existing structure and will be occupied during the term of this contract.

b. Services to and throughout the building shall be maintained. Services may be interrupted only by obtaining permission to do so from the Owner in writing.

c. All materials and debris removed from construction shall become the property of the Contractor and he shall remove same from the premises as directed.

d. The work of the Contract shall be progressed in such a manner as to interfere as little as possible with the functioning of the Premises and with the safety and convenience of the occupants, staff, and others employed in and about the premises.

e. Contractor's attention is directed to the phasing of the work as determined by the Owner and shall schedule all delivery of materials and manpower requirements to expedite the work accordingly.

f. Routes of ingress and egress to the building and within the building to the site of the work shall be over routes as directed by the Owner's representative.

g. Delivery of materials and removals of debris shall be arranged for within time limits established by the Owner. The Contractor shall not, except as otherwise agreed to , deliver any materials to the site unless his forces are present and available to receive and unload it.

P-20 REGULATIONS

a. The Contractor shall familiarize himself with and comply with building regulations and rules to maintain the safety of the premises and its occupants at all times.

P-21 CLEANING

a. The Contractor shall neatly pile, store and protect all materials in locations on the premises where approved and directed. During work operations on the interior of the buildings, all refuse and debris shall be removed and the areas left broom clean.

NEW YORK SOCIETY OF SECURITY ANALYSTS (NYSSA)
One World Trade Center
44th Floor
New York, NY
RDA No. 655.041.00

SPRINKLER SPECIFICATIONS

SP-1 GENERAL

a. The Contractor shall perform work of this Section in accordance with the Rockefeller Center Building Standard, General and Specific Conditions of these Specifications and the Base building Standards.

b. All work and materials shall comply with applicable provisions of the New York City Building Code RS-17-2, NFPA 13-1989 and B.S. of A 310-90 BCR.

SP-2 WORK INCLUDED

a. Work shall include the providing of all labor, materials, equipment, accessories, and tests necessary to complete and make ready for operation the installation of a new hydraulic sized type automatic wet pipe sprinkler system with light hazard occupancy as indicated on the Drawing.

b. The installation shall be accomplished by an authorized sprinkler contractor recognized as a fully experienced specialist in the automatic sprinkler systems by the Building Department of the City of New York.

c. The installation shall be made on the basis of items, methods, and requirements of Department of Buildings of the City of New York. The provisions shall be followed in total, whether the stipulations listed therein are directed or recommended.

d. See Architectural, Structural, Mechanical and Electrical Drawings for construction and interference details. Any changes that may be necessary because of the physical conditions or compliance with the standards shall be made under this Section without additional cost.

e. System shall include, but not necessarily be limited to the following:

1. Connection of new sprinkler system with gate valve, tamper switch, waterflow switch, inspectors test and drain connection, sprinkler heads and branches to existing combined Fire Standpipe/Sprinkler Riser .
2. New sprinkler heads of the flush and upright types.
3. All piping hangers supports.
4. Preparation of complete and detailed working drawings.

5. Obtaining all necessary approvals, permits and certificates including filing drawings with hydraulic calculations signed and sealed with the New York City Building Department.
6. Shutdown, drainage and testing shall be on overtime in coordination with Fire Department and Building Management.
7. Cutting and patching.
8. Maintaining a fire watch guard during shut-down of system.

f. Working Plans

1. Before commencement of any work, complete and detailed working plans shall have been submitted and approved by the City of New York and other agencies having jurisdiction thereof. Two certified copies of such approved working plans shall be furnished to the Owner promptly after such approval.

2. Working plans shall be drawn to an appropriate scale on tracing cloth or film.

g. Insurance: This section shall carry Liability and Workmen's Compensation Insurance for the duration of the Contract and protect the Architect against all lawsuits from accidents to the public and workmen. All premiums are to be paid by this Section and the policies are to cover any and all persons and contingencies in connection with the installation of the work included in this section.

SP-3 INSTALLATION

a. Specific reference in this section or on the drawings to any article, device, project, material or equipment by name, make, or catalog number shall be interpreted as establishing a basis and standard quality. All the devices shall be of the made and type listed by the Underwriters' Laboratories, Inc., approved by the local building code, and NFPA. No consideration will be granted for any alleged misunderstanding of the materials to be furnished or work to be done due to lack of information on the drawings or in the specifications.

b. This Contractor shall make modifications in respect to location of sprinkler heads, as may be required by field conditions or as may be found necessary by the Architect at the time of installation. Fittings, hangers, means of draining system and all necessary appurtenances shall be installed as required.

c. Any changes that may be necessary because of physical conditions or compliance with the standards and requirements of any agency having jurisdiction shall be made by this Contractor without additional cost to the Owner.

d. The system shall be so installed that no part thereof will interfere with doors, windows, heating, plumbing or electrical equipment, and sprinkler heads shall not be located closer than one foot from lighting fixtures or other obstructions. In connection therewith, the Contractor shall coordinate his work with the other trades so as to avoid any interference with the automatic sprinkler system.

e. This Contractor shall furnish and set sleeves in walls as required.

f. After the piping installation has passed the hydrostatic test, all iron and steel parts shall be thoroughly cleaned and ready for painting.

g. All piping shall be accurately cut to measurements established by this Contractor and shall be worked into place without springing or forcing.

h. Drips and drains shall be installed at low points and where required and shall discharge to open slight drains or to interior floor drains.

i. All pipe openings shall be capped or plugged during construction and all piping shall be flushed out before closing system.

j. The use of bushing to reduce the size openings of fittings is prohibited.

k. Before ordering any material or doing any work, the Contractor shall verify all measurements, ceiling heights and conditions at the size and will be held responsible for the correctness of the same.

l. Extra charges or compensation will not be allowed on account of the differences between actual measurements and the dimensions shown on the drawings, but any such differences which may be found shall be submitted to the Architect for adjustment, before proceeding with work.

SP-4 MATERIALS

a. Pipe shall be Schedule 40 black steel with approved standard weight cast iron sprinkler fittings. Drain and test piping shall be galvanized.

b. O.S.& & gate valves shall be Base Building Standard Nibco or Milwaukee Manufacturing Company with tamper switches.

c. Inspectors test with sight core and drain connection shall be Base Building Standard.

d. Waterflow switch shall be vane-type with recycling pneumatic retard element with an adjustable range of 0 to 70 seconds.

e. Sprinkler Heads

1. Sprinkler heads shall be as Underwriters' Laboratories listed approved of ordinary degree rating except as otherwise noted of 165 F, and shall be cast brass fusible link spray type with 1/2' discharge orifice.

2. New flush type sprinkler head with white coverplate shall be Reliable Model G4FR.

f. Hangers: Brackets and Supports

1. Furnish and install hangers, brackets, beam clamps, clips, inserts, and mounting devices to support all piping in accordance with NFPA Pamphlet No. 13.

2. Hangers shall be secured directly to the building construction, in an approved manner.

g. Escutcheons

1. Unless otherwise noted, provide approved type chrome plated cast brass escutcheons on all exposed piping through floors, walls or partitions in finished areas.

2. Escutcheons on uninsulated pipes shall be held in place by set screws.

3. Where sleeve or fitting projects slightly from walls or partitions, provide special deep type escutcheons to cover each case.

h. Sprinkler Cabinet

1. Furnish new sprinkler cabinet with six (6) extra heads of types required.

2. Location and mounting of cabinet shall be coordinated with Owner.

SP-5 ALTERATION WORK

a. This contractor shall not interrupt or shutdown the existing sprinkler systems without the Owner's permission. All shut-downs of the existing system shall be coordinated with the Owner, building and local fire department.

b. Remove debris, rubbish and superseded material from the site daily. Clean work to Owner's approval.

c. A fire watch guard with a certificate of fitness shall be maintained during all shut-downs.

SP-6 VISITING THE PREMISES

a. This Contractor, before submitting his bid on the work, must visit the site and familiarize himself with all visible existing conditions. As a result of having visited the premises, this Contractor shall be responsible for the installation of the work as it relates to such visible existing conditions.

b. The submission of a bid will be considered an acknowledgment on the part of the bidder of his visitation to the site. No additional compensation will be allowed for difficulties or additional work related to existing visible conditions.

SP-7 PAINTING

a. All finished painting of piping shall be done under this section.

b. All piping and equipment, whether painted in shop, factory of field, shall be wire brushed and cleaned of dirt, rust, grease and other foreign matter before prime coating.

SP-8 TESTS

a. The entire sprinkler system shall be tested as required in the New York City Building Code and as required by all agencies having jurisdiction.

b. No part of the system to be concealed shall be covered up or closed in until such portions have been tested and approved.

c. Contractor shall notify the Architect and the various agencies, departments and bureaus having jurisdiction in advance of the time that the tests are to be made. Give not less than 48 hours' notice.

d. The sprinkler system shall be hydrostatically tested at a pressure of 200 psig, for two hours with no leaks.

SP-9 GUARANTEE

a. This Sprinkler Contractor shall submit in writing (triplicate) a guarantee of this sprinkler work in accordance with the standard conditions as established under the AIA rules and regulations.

b. Such guaranteed shall be for a period of one (1) year after the date of final acceptance of the work, and shall include the making of any repairs which may be required owing to the defective workmanship and materials.

c. The guarantee shall include replacing same at this Sprinkler Contractor's expense, including all other work disturbed by such repairs and work damaged by defective workmanship and materials under this contract, to the entire satisfaction of the Owner.

SP-10 UNIT PRICES

a. General: State in proposal a unit price per head to be added or deducted if additional or fewer heads are required due to a change in design or scope of work. Submit the prices in the following form:

Unit	Increase	Decrease
Flush type head with white coverplate	$_____	$_____
Upright type head chrome plated	$_____	$_____

b. Any deletion of heads or nozzles, interchange or substitution in type of heads or nozzles shall be made in accordance with the price established for such changes.

c. The prices shall include (on a unit basis per head) all necessary branch piping, cross mains, fittings, hangers, etc., as required to make the system complete, but shall not include bulk or feed mains or branch piping in excess of 15 feet for a single head or nozzle.

protective device next ahead of it in the distribution system. The circuit breakers shall be rated for not less than 10,000 amperes interrupting capacity (14,000 amperes for 277 or 480 volts).

4. Interrupting capacities referred to are symmetrical values, RMS according to NEMA standards.

5. Circuit breakers to be as manufactured by General Electric, Westinghouse, Square D or ITE. Where installed in existing panelboards they shall match existing panelboards.

g. Fuses

1. Fuses where required for circuits below 600 volts shall high interrupting capacity, current limiting rejection type, Bussmann Type FRN (FRS) or Gould-Shawmut type TR (TRS), ratings as required.

2. Provide 33% spare fuses of each size.

h. Molded Case Circuit Breakers

1. Provide new circuit breakers for existing panels as shown on the panel schedules to conform to the new layout.

2. General characteristics of molded case circuit breakers shall be:

a) Single, 2 or 3 pole, as noted.
b) Thermal-magnetic type.
c) Mechanism: Quick-make, quick,break, trip-free type.
d) Contacts: Non-welding.
e) Automatic Tripping: Clearly indicated by handle automatically assuming position distinctive from moral "ON" and "OFF" positions.
f) Provide shunt trip or GFI type circuit breakers where indicated on the panel schedules.

3. All circuit breakers shall have interrupting capacities adequate for their locations, generally. Unless indicated otherwise, the interrupting capacity of any circuit breaker shall be greater than the let-through current of the protective device next ahead of it in the distribution system. The circuit breakers shall be rated for not less than 10,000 amperes interrupting capacity (14,000 amperes for 277 or 480 volts).

4. Interrupting capacities referred to are symmetrical values, RMS according to NEMA standards.

5. Circuit breakers to be as manufactured by General Electric, Westinghouse, Square D or ITE. Where installed in existing panelboards they shall match existing panelboards.

i. Fuses

1. Fuses where required for circuits below 600 volts shall high interrupting capacity, current limiting rejection type, Bussmann Type FRN (FRS) or Gould-Shawmut type TR (TRS), ratings as required.

2. Provide 33% spare fuses of each size.

E-11 TRANSFORMERS

a. Transformers For Non-Linear Loads

1. Transformers are to be UL 1561 Listed, International Transformer Corporation Type "NS" or approved equal. Transformers shall be specifically designed to supply rated current when loaded with up to a 50% Non-Linear and a 50% Linear load.

2. Transformers shall be 3 phase, 60 Hertz. Primary winding shall be delta connected and secondary winding shall be wye connected.

3. The Insulation System shall be a UL Component Recognized 220 degree C system. The temperature rise with a 50% Non-Linear and a 50% Linear load shall not exceed (115 degrees C rise by resistance. (K-Factor-4)

4. The windings shall be copper.

5. The higher voltage winding shall have quantity (6) 2.5% taps - (2) FCAN and (4) FCBN. A copper electrostatic shield shall be inserted between the primary and secondary windings to attenuate high frequency harmonics.

6. The secondary conductors shall all be individually insulated, as small in size as possible, and transposed where necessary to keep hysteresis and eddy current losses at the harmonic frequencies to an absolute minimum. The secondary neutral shall be twice the amapcity of the secondary phase conductors, and the primary winding conductor shall be of sufficient size to limit the temperature rise to its rated value even with the circulating 3rd Harmonic current.

7. The Basic Impulse Level of all windings shall be 10 KV.

8. The core flux density shall be well below the saturation point to prevent core saturation caused by the non-linear harmonics even with a 10% primary overvoltage.

9. Transformer enclosure shall be suitable for both indoor and outdoor installation.

10. Transformer terminals shall be front connected for ease of installation and maintenance.

E-12 GROUNDING

a. Provide complete systems and equipment grounding as shown on the plans and described herein. All ground wires shall be stranded type.

b. Ground conductors shall be insulated and colored green or colored green with a yellow stripe of stripes. Ground conductors always shall be run inside raceways or enclosures with phase conductors, except where shown otherwise.

c. Connect system components mechanically and electrically to provide an independent return path to the grounding electrode.

d. Clean metals thoroughly where ground terminal connectors are brazed to equipment and repaint impaired surfaces.

e. Size ground conductor in accordance with New York City Electrical Code requirements, except do not use conductor smaller than No. 10 AWG.

f. Extend existing grounding system to include all the electrical work in the scope of this alteration.

g. Ground each general purposed transformer by running a conductor from the transformer neutral to a lug welded or brazed to the interior of the enclosure. Run cable from this lug and connect to Building Steel.

h. Equipment grounding shall consist of connecting electrically non-current carrying conductive equipment enclosures and raceways as shown on the drawings.

i. Ground motors by connecting a green covered conductor from a grounding bushing in the starter to the motor frame. Conductor shall be installed inside the conduit with the circuit conductors, and terminated in the motor connection box. If this is not feasible, terminate grounding conductor using a listed or labeled "G" clip or ground screw. Conduit size between starter and motor shall be increased if necessary to accommodate the addition of the ground wire.

j. Provide a ground bus in the new Communication Room panelboard and connect a green covered conductor from the grounding terminal of each isolated ground type receptacle to the ground bus of the panelboard. Connect this ground bus to building steel

k. Ground the fixture by connecting a green covered conductor from the ground lug welded within the fixture housing to a grounding conduit bushing or acceptable grounding clip in the outlet box. Run grounding conductor inside raceway with circuit conductors.

l. Provide a ground reference bar in the Communication Room and connect to building steel or to the building ground riser.

m. All ground connections to building steel shall be made using Caldweld connectors.

E-13 MOTORS AND APPARATUS FURNISHED BY OTHERS

a. Install all wiring in conduits. Connect conduit to motor conduit terminal boxes with 18" to 24" of flexible conduit from end or conduit to motor terminal box. Conduit shall not terminate in or be fastened to motor foundation. Allow clearance for motor removal.

b. Provide connections to all motors, controllers, disconnects, lockout, actuating and control devices. Conductors to motors same as to controllers except as noted.

c. Motors, controllers, actuating and control devices will be supplied under other sections of work, except as noted.

d. Accept delivery of controllers, erect on walls as indicated and wire under this Section except as noted.

e. Wire to all motor and actuating devices supplied and installed under other Sections of work except as noted.

f. Furnish disconnect switches under this Section except as noted.

g. Coordinate motor terminal and connection box size with Section of work supplying and installing motors.

h. Leave motor, control and actuating equipment ready for operation.

i. As certain exact locations of controllers and control services prior to installation and wiring.

E-14 ELECTRICAL CONTROLS AND POWER WIRING

a. Provide power and control wiring to all electrically operated equipment devices furnished for this project. All controls shall be on ungrounded side of control circuit.

b. Wire and connect the electrical, heating, ventilating, air conditioning protection and control devices except as otherwise noted.

c. Provide 120-volt service to control panels and miscellaneous control devices in accordance with approved wiring shop drawings furnished by other trades. Install all interlock wiring between equipment starters and control devices.

d. The electrical Contractor shall wire up all devices and equipment so as to provide a fully operating and satisfactory system.

e. All control wiring shall be installed in conduit.

f. Final connections to low voltage control will be by Electrical Contractor, except where otherwise noted.

g. Pay specific attention to notes on Drawing E-5!

E-15 LIGHTING FIXTURES

a. Lighting fixtures shall comply with or exceed the latest requirements of the New York City Code, and shall bear the label of the Underwriters' Laboratories, Inc. All fluorescent fixtures shall be equipped with ballasts as described in the fixture schedule. All ballasts shall be Class "P" rated. Provide energy saving lamps and electronic energy saving ballasts as specified in the project.

b. Furnish and install all new lighting fixture of the types indicated at each location shown on the drawings.

c. Do not scale RDA's drawings for exact location of lighting fixtures. RDA's drawings are intended only to be indicative of proportional spacing for the effect desired. In general, the architectural reflected ceiling plans indicate the proper locations of lighting fixtures.

d. Furnish and install required lamps in every new lighting fixture of wattages, quantities, and types specified and shown on the drawings. Fluorescent fixtures may be furnished to the jobsite pre-lamped.

e. Furnish each fixture with not less than 6'-0" of wire in 3/8" flexible metallic conduit for connections to outlet box. Wire size shall be not less that #12 AWG. Tails may be factory installed.

f. Final finish on all light reflecting surfaces and exposed trim on fixtures shall be baked white enamel unless specified otherwise.

g. Existing fixtures shall be washed clean and equipped with new lamps.

h. Install each fixture properly and safely. Furnish and erect hangers, rods, mounting brackets, supports, frames and other equipment required.

i. Each lighting fixture shall be packaged with complete instructions and illustrations showing how to install. Install lighting fixtures in strict conformance with manufacturers' recommendations and instruction.

j. Support all lighting fixtures independently of ductwork or piping.

E-17 FIRE STOP SEALANT:

a. Provide fire-resistant silicone foam fill to restore fire ratings to all wall or floor or ceiling penetrations. Foal fill must be UL classified and have a New York City Materials and Equipment Acceptance (MEA) listing for use as wall or floor opening multiple cable system protective material.

b. All penetrations through fire rated floors and wall shall be sealed to prevent the passage of smoke, fire, toxic gas or water through the penetration either before, during or after a fire. The fire rating of the penetration seal shall be at least that of the floor or wall into which it is installed, so that the original fire rating or the floor or wall is maintained as required by Article 300-21 of the National Electric Code.

c. No flammable material may be used to line the chase or hole in which the fire stop material is to be installed.

d. When damming materials are to be left in place after the seal is complete, then all such materials shall be non-flammable.

e. The sealant shall be poured into the hole after each cable or pipe has been spread to allow approximately 1/2" of foam to flow between them. No cable or pipes may be touching each other and thereby allow voids to form in the fire stop.

f. When plastic cartridges are used for smaller installations, the chemical components of the foam shall be premeasured within the cartridges to insure the proper ratios. For larger installation, where a Chase-Foam Mixing Machine is used, the machine should be preset so that only the correct ratio of the two chemical components will be delivered without any possibility of error and without the need for constant technical supervision.

g. The sealant shall remain resilient and pliable to allow for the removal and/or addition of cable without the necessity of drilling holes. It shall adhere to it self perfectly to allow any and all repairs to be made with the same material. It shall allow for vibration, expansion and/or contraction of anything passing through the penetration without affecting the seal, or cracking, crumbling and spalling.

h. When sealant is injected into a penetration, the foam shall expand to surround all the items within the penetration and maintain

pressure against the walls of the penetration as well as the pass-through items. The foam shall cure within five minutes and be fire resistant at that time. No heat shall be required to further expand the foam to black the passage of fire and smoke or water.

i. The foam sealant shall have been subjected to fire exposure in accordance with standard time-temperature curve in the Standard, UL, ASTM E119, and NFPA 251. The foam fire-stop shall have also been subjected to the hose stream test in accordance with UL 10B. The foam sealant shall be UL Classified as a Fill, Void or Cavity material for use in Wall or Floor Openings. the foam sealant shall be UL Classified 3M Fire Barrier CP-25.

j. Coordinate application with physical parameters of openings to be sealed. Provide solid bottoms, and solid covers and trayto-box connectors where wireways or other cable support systems penetrate fire rated walls.

E-18 RECEIVING AND SETTING OF COMMUNICATION EQUIPMENT

a. Electrical Contractor shall include in his price the following items:

1. Receiving and transporting of all equipment from the loading dock up to the Communication Room on the 104th Floor.

2. The setting and mounting on the raised floor of all computer equipment as shown on the Architectural Drawings. Coordinate exact location in the field with Architect and tenant prior to installing.

E-19 TELEPHONE AND DATA CONDUIT SYSTEM

a. For wall mounted telephone/data outlets provide outlet boxes with empty conduit stubs down to the raised floor as required. Leave system ready for pulling wires by telephone vendor.

b. Stubs shall consist of empty electrical metallic tubing (EMT) from the telephone outlet box to the raised floor. Stubs shall be terminated with an insulated bushing 3 inchesbelow the top of the raised floor.

c. Consult and install all necessary equipment in full conformity with the requirements of the telephone vendor.

E-20 SECURITY SYSTEM

a. The security equipment scheduled for installation as part of this project will be bid separately. Work by the contractor shall be limited to the installation of junction boxes and conduit stubs for the Security System. This contractor shall also provide power supplies and low voltage transformers as shown on wiring diagrams.

E-21 CLASS "E" ALARM SYSTEM MODIFICATIONS

a. Contractor shall remove all ceiling mounted smoke detectors in the two existing Communications Rooms. Re-install detectors in the new Communications Room.

b. Rework wiring as required to maintain continuity on all smoke detector circuits remaining operational. Remove wiring back to data gathering panels where appropriate.

c. File form A.433R with the Fire Department indicating the extent of the revisions to the existing smoke detection system.

d. All work on the Class "E" System shall be coordinated with building management.

e. All wiring shall be red, jacketed with Teflon insulation and labeled "Fire Alarm Service" along its length.

f. Fire alarm cable shall be multi-conductor, stranded, copper cable with teflon insulation and jacket. Outer jacket shall be Fire Department red and stenciled with the legend INTERIOR FIRE ALARM SYSTEM. Cables shall be manufactured in accordance with the requirements of the New York City Building Code, Reference Standard 17-3B, Item 6.

E-22 RECORD DRAWINGS (AS-BUILT)

a. Concurrent with progress of installation, maintain a set of as-built record drawings with additional sketches as required, denoting and dimensioning accurately all changes in elevation, location and size of all items deviating from contract drawings.

b. Within three weeks following beneficial occupancy of the project, (2) sets of as-built drawings as well as two sets of maintenance manuals, operating manuals and drawings (including shop drawings) of all electrical equipment shall be submitted to the Owner.

NEW YORK SOCIETY OF SECURITY ANALYSTS (NYSSA)
One World Trade Center
44th Floor
New York, NY
RDA No. 655.041.00

PLUMBING SPECIFICATIONS

P-1 GENERAL

a. All work in this section is subject to the General and Specific Conditions of these Specifications and the Base Building Standards.

b. All work and materials shall comply with applicable provisions of the New York City Building Code.

P-2 WORK INCLUDED

a. It is the intent of these specifications to have this Contractor provide for the furnishing of all labor, materials, protection and supervision necessary and required to complete the Plumbing Work as indicated on the Drawings and described or referred to in these specifications.

b. All plumbing and drainage systems shall be installed in accordance with the pertinent requirements of the Local Building Code, National Sanitation Foundation, Health Department and other agencies or department having jurisdiction.

c. All work shown on the drawings is diagrammatic and shall be installed to fit actual building conditions, all subject to approval. This Contractor shall, as part of this Contract, furnish all incidentals such as pipes, fittings, valves, pipe hangers and supports, etc., and all removals, testing, cleaning and miscellaneous items necessary to leave each system complete in every detail and ready for operation.

d. If mention has been omitted in the specifications of any work shown on the drawings or if work not shown on the drawings is called for in the specifications, same shall be included as part of the work of this Contractor.

e. Special care shall be taken during construction to prevent unnecessary damage to existing structure. All removal and cutting to permit installation of new equipment or piping shall be done only after receiving approval of Owner's representative. Equipment to be removed is the property of the owner and shall be disposed of as directed.

f. Provide all labor and new materials required for the installation of new water closet, lavatory, waste, hot and cold water piping, for a complete system ready for Owner's use.

g. Care shall be taken when cutting into existing water and drainage line to prevent accidental flooding of premises.

h. Perform all necessary removals of existing plumbing piping and materials. All existing plumbing materials must be removed before new work is commenced. All new work in ceiling below shall be on overtime and coordinated with Building Management and Tenant.

i. Filing and paying all fees and obtaining all approvals from the Local Building Department and authorities having jurisdiction.

P-3 RELATED WORK IN OTHER SECTIONS

a. Patching and framing.

b. All electrical conduits, power wiring, etc. for equipment.

P-4 OPENINGS AND CHASES

a. Provide all openings, chases, recesses and bucks that are required for the admission of the work.

b. Inspect the general plans for pipe spaces. Do all necessary cutting, if such is required, to allow for the admission of the work. Remove all surplus materials and dispose of same, as and where directed.

c. Cutting shall be done with hand tools. No cutting by jackhammer will be permitted.

P-5 CONSTRUCTION NOTES

a. It is the intent that each part of the system shall be complete in all details and water lines provided with all control valves necessary for satisfactory operations and maintenance.

b. Examine carefully the plans of other trades in detail and all conditions relative to the installation of piping.

c. In no case shall piping be exposed beyond finished plaster lines unless specifically shown otherwise on drawings. Consult with the other trades in the building and install piping in such a way as to least interfere with the installation of other trades.

d. The water piping shall be installed so as to drain and branches shall not be trapped but shall have continuous pitch.